FINAL

WORK PLAN
Amendment to the Closures of IWTPs 25 and 32
Alameda Point
Alameda, California

Environmental Remedial Action
Contract Number N62474-98-D-2076
Contract Task Order 0013

Document Control Number 7031
Revision 1

December 17, 2003

Submitted to:

Department of the Navy
Southwest Division
Naval Facilities Engineering Command
Environmental Division
1220 Pacific Highway
San Diego, California 92132-5190

Submitted by:

Shaw Environmental, Inc.
4005 Port Chicago Highway
Concord, California 94520-1120

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Approved by: Daniel L. Shafer
Daniel Shafer
Shaw Project Manager

Date: December 17, 2003

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12.17.03

DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132-5190

5090
Ser 06CA.LO/1588
December 17, 2003

Ms. Wei Wei Chui
Section Chief
Standardized Permits and Corrective Action Branch
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, CA 94710-2721

Dear Ms. Chui:

Subj: FINAL WORK PLAN FOR INDUSTRIAL WASTE TREATMENT PLANTS 25 AND 32, HAZARDOUS WASTE FACILITY PERMIT EPA ID CA2170023236 NAVAL AIR STATION NOW KNOWN AS ALAMEDA POINT, ALAMEDA, CALIFORNIA

The subject document was transmitted to you and to distribution on December 8, 2003. Per the request of Mr. Dean Wright of the Department of Toxic Substances Control, we are changing the title from "Final Work Plan RCRA Corrective Actions IWTP 25 and 32" to "Final Work Plan Amendment to the Closures of IWTP 25 and 32". The enclosed replacement pages are forwarded via United Postal Service for your insertion in the binder.

Should you have any questions, please contact Mr. Lou Ocampo, Navy Remedial Project Manager at (619) 532-0969 or me at (619) 532-0907.

Sincerely,

for/ THOMAS L. MACCHIARELLA
BRAC Environmental Coordinator
By direction of the Commander

Encl: (1) Four (4) Replacement Pages

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Shaw™ Shaw Environmental, Inc.

SHAW TRANSMITTAL/DELIVERABLE RECEIPT

CONTRACT : N62474-98-D-2076 **DOCUMENT CONTROL NUMBER : 7031.1**

TO: Administrative Contract Officer
Southwest Division
Naval Facilities Engineering Command
Michelle Crook, 02R1.MC
1230 Columbia St., Suite 870
San Diego, CA 92101-5817

Date : December 18, 2003

CTO : 0013

Location: Alameda

FROM: D. W. Bad
for Dan Shafer
Project Manager

DESCRIPTION OF ENCLOSURE : *Final Work Plan, RCRA Corrective Actions at IWTPs 25 and 32, Alameda Point, Dated December 8, 2003.*

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DEPARTMENT OF THE NAVY
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5090
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December 8, 2003

Ms. Wei Wei Chui
Section Chief
Standardized Permits and Corrective Action Branch
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700 Heinz Avenue, Suite 200
Berkeley, CA 94710-2721

Dear Ms. Chui:

Subj: CORRECTIVE ACTIONS AT INDUSTRIAL WASTE TREATMENT PLANTS 25 AND 32, HAZARDOUS WASTE FACILITY PERMIT EPA ID CA2170023236 NAVAL AIR STATION NOW KNOWN AS ALAMEDA POINT, ALAMEDA, CALIFORNIA

Enclosure (1) is forwarded via Federal Express for your information and use. It is the Final Work Plan for the closures of the subject Industrial Waste Treatment Plants (IWTPs), and was prepared in accordance with the final amendments of the closure plans for each facility. The Navy response to Department of Toxic Substances Control (DTSC) review comments on the draft work plan has been incorporated in this final document. The comments have been resolved through Mr. Dean Wright of DTSC.

We thank you and Mr. Wright for your support on this project. Should you have any questions, please contact Mr. Lou Ocampo, Navy Remedial Project Manager at (619) 532-0969 or me at (619) 532-0907.

Sincerely,

THOMAS L. MACCHIARELLA
BRAC Environmental Coordinator
By direction of the Commander

Encl: (1) Final Work Plan for IWTPs 25 & 32 of December 8, 2003

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SHAW TRANSMITTAL/DELIVERABLE RECEIPT

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TO: Administrative Contract Officer
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Date : December 08, 2003

CTO : 0013

Location: Alameda

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for Dan Shafer
Project Manager

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Date/Time Received ________/__________

Draft Work Plan and Sampling and Analysis Plan (Field Sampling Plan/Quality Assurance Project Plan), RCRA Corrective Actions at IWTPs 25 and 32 Alameda Point, Alameda, California, September 30, 2003

Comments by: Dean Wright, RG			
Comment No.	**Section, Figure, Table**	**Comments**	**Response**
1	Table 2, Appendix A	GSU would like additional clarification regarding the intended use of Environmental Protection Agency (EPA) Preliminary Remediation Goals (PRGs) as discussed in the document and in Table 2 of Appendix A, since the DTSC Hazardous Waste Management Program does not typically use EPA PRGs to determine risk-based clean-up levels.	Comment noted. Shaw will clarify in the SAP that PRGs will be used as an initial screening tool for soil organics and background levels will be used for inorganics, however, when all data is available, a quantitative risk assessment will be completed to make risk management decisions for closure. Individual screen results will not be relied upon for risk decisions and all data will be included. Section 2.3.1 of the SAP has been revised based on this comment.
2	Table 2, Appendix A	Appendix A, Table 2. Laboratory reporting limits for Arsenic and Hexavalent Chromium appear elevated. GSU recommends that lower reporting limits for Arsenic and Hexavalent Chromium be obtained.	The reporting limits (RL) for arsenic and hexavalent chromium are standard laboratory reporting limits using EPA Method 6010B and 7196A, respectively. The proposed RLs are below the PRGs and MCLs (shown in Table 2) a minimum of 5 times. The laboratory will report any detected concentrations of arsenic and hexavalent chromium above the method detection limit (MDL) but below the RL as estimated (J) concentrations. No changes to the text were made as a result of this comment.
3		A minimum of five working day notice should be provided to DTSC prior to commencing any field activities.	Concur. This requirement is now included in Section 5.1, “Mobilization”, of the Work Plan.
4	4.2, 4.3 (WP)	If requested by DTSC, the facility should collect, preserve and transport duplicate or concurrent soil and groundwater samples for analysis at DTSC Hazardous Materials Laboratory (HML).	Comment noted. A statement has been included in Sections 4.2 and 4.3 of the WP indicating that DTSC may collect field duplicate (split) soil and groundwater samples at their discretion.

Additional Changes made for consistency with the TTEMI Closure Plan Amendment for IWTP 32			
Change No.	**Section, Figure, Table**	**Comments**	**Change**
1	Figure 3 and associated text	NA	Per DTSC request, additional soil sampling is now included for IWTP 32. Four locations are proposed; two on the east side and two on the south side of Building 32. At each location, three depths are proposed: 0 to 6 inches; 4 to 4.5 feet, and the groundwater interface. These depths may be modified in the field depending on the location of the groundwater table. Relevant sections of the Work Plan and the Sampling and Analysis Plan have also been revised.
2	Figure 3	NA	Figure 3 now shows the proposed soil sampling locations at Building 32. Per DTSC requests, a note is also included that indicates the direction of groundwater flow beneath Building 32.

N00236.001751
ALAMEDA POINT
SSIC NO. 5090.3

DRAFT FINAL
AMENDMENT TO THE CLOSURE PLAN
INDUSTRIAL WASTE TREATMENT PLANT 25

DATED 19 AUGUST 2003

IS FILED AS ADMINISTRATIVE RECORD NO.
N00236.001634

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Acronyms and Abbreviations

µg/L	microgram(s) per liter
ARARs	applicable or relevant and appropriate requirements
BAAQMD	Bay Area Air Quality Management District
BCT	BRAC Cleanup Team
bgs	below ground surface
BRAC	Base Realignment and Closure
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract Laboratory Program
COC	chain of custody
CRZ	contaminant reduction zone
CSO	Caretaker Site Office
DO	Delivery Order
DOT	U.S. Department of Transportation
DQO	Data Quality Objective
DTSC	Department of Toxic Substances Control
EBMUD	East Bay Municipal Utility District
EBS	Environmental Baseline Survey
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
EZ	exclusion zone
HAZMAT	hazardous materials
IDW	investigation-derived waste
IR	Installation Restoration
IR	Installation Restoration
IT	IT Corporation
IWTP	Industrial Waste Treatment Plant
LBP	lead-based paint
LCS	laboratory control sample
mg/kg	milligrams per kilogram
NADEP	Naval Aviation Depot
NARF	Naval Airlift Refit Facility
NAS	Naval Air Station
Navy	U.S. Department of the Navy
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyl
PMB	plastic media
PPE	personal protective equipment
PRG	Preliminary Remediation Goal
PVC	polyvinyl chloride

Acronyms and Abbreviations (continued)

QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
ROICC	Resident Officer in Charge of Construction
SAP	Sampling and Analysis Plan
SDG	sample delivery group
SHSP	Site Health and Safety Plan
SOP	Standard Operating Procedure
SVOC	semi-volatile organic compound
SWDIV	U.S. Department of the Navy, Southwest Division
TtEMI	Tetra Tech EM, Inc.
TTO	total toxic organic
U.S.C.	United States Code
VOC	volatile organic compound
WP	Work Plan

1.0 Introduction

Naval Air Station (NAS) Alameda (Alameda Point) has been designated for closure under the Base Realignment and Closure (BRAC) program. Compliance activities are being performed for permit closure of Resource Conservation and Recovery Act (RCRA) facilities at Alameda Point as part of the base closure. The BRAC Cleanup Team (BCT) agreed that closure requirements for Industrial Waste Treatment Plants (IWTPs) 25 and 32 would be fulfilled by conducting a RCRA Part B Permit Closure. RCRA Part B requirements are per the Department of Toxic Substances Control's (DTSC) Hazardous Waste Facility Permit for NAS Alameda, U.S. Environmental Protection Agency (EPA) No. CA 2170023236, (DTSC, 1993).

This Removal Action Work Plan (WP) has been prepared by Shaw Environmental, Inc., under Remedial Action Contract No. N62474-98-D-2076, to describe the RCRA Part B removal actions being undertaken by the U.S. Navy (Navy) Southwest Division (SWDIV) for two IWTPs at the former NAS Alameda. This Removal Action WP supplements the Closure Plan Amendments for IWTPs 25 (dated August 19, 2003) and 32 (currently under preparation), and details specific steps to be taken to remove all RCRA Part B permitted and non-permitted waste tanks at IWTPs 25 and 32 (see Tables 1 and 2). Waste conveyance piping will also be removed as part of this activity. This WP also outlines additional soil and groundwater confirmation sampling at IWTPs 25 and 32 (soil only) to assess whether hazardous constituents from the IWTP units have been released into the subsurface media.

1.1 Purpose

The intent of this WP is to provide required documentation and direct removal actions to dismantle and dispose of RCRA Part B permitted and non-permitted waste tanks at IWTPs 25 and 32 for the purpose of satisfying closure requirements of the RCRA Part B permit for these facilities. Specifically, the objectives of this project include:

- Remove all permitted and non-permitted waste tanks and associated waste conveyance piping at IWTPs 25 and 32 for recycling or disposal, as appropriate
- Abatement of lead based paint (LBP), if present, on the tank surfaces
- Conduct soil and groundwater confirmation sampling beneath IWTPs 25 and 32 (soil only) to assess any potential release of contamination
- Restoration of site and affected areas

All work will be conducted in accordance with the requirements of the current Navy Scope of Work and Closure Plan Amendments prepared by the Navy (Tetra Tech, EM, Inc. [TtEMI], 2003a and b).

1.2 Work Plan Organization

This WP is organized into the following sections:

- Section 1.0 – Introduction: Summarizes the purpose, objectives, and organization of the WP.
- Section 2.0 – History and Background: Provides a general site background, site history, brief description of current site conditions, and a summary of the results of the previous activities that are applicable to this WP.
- Section 3.0 – Previous Investigations: Provides a summary of pertinent previous soil and groundwater confirmation sampling completed for the sites.
- Section 4.0 – Subsurface soil and groundwater confirmation sampling at IWTPs 25 and 32 (soil only): Presents a discussion of the proposed soil and groundwater confirmation sampling beneath IWTP s 25 and 32 (soil only).
- Section 5.0 – Site Preparation: Presents a discussion of site preparation activities including mobilization, site security, site layout, and site traffic.
- Section 6.0 – Removal of Tanks and Associated Waste Conveyance Piping: Presents a discussion on the work planned for the dismantling and demolition of the tanks and waste conveyance piping at IWTPs 25 and 32.
- Section 7.0 – Investigation-Derived Waste Management: Presents Shaw's methods for managing investigation-derived wastes during implementation of this WP.
- Section 8.0 – Environmental Protection Plan: Presents Shaw's methods of protecting environmental resources during fieldwork activities and post-construction restoration and cleanup.
- Section 9.0 – References: Presents a list of all documents cited within this WP.

2.0 History and Background

The following subsections present relevant background information including history of past activities for IWTPs 25 and 32.

2.1 Site Location and Description

Alameda Point, formerly NAS Alameda, is located on the western tip of Alameda Island, along the eastern margin of San Francisco Bay. The northern portion of Alameda Island was formerly tidelands, marshlands, and sloughs adjacent to the historical San Antonio Channel, now known as Oakland Inner Harbor. Most of the land that is now Alameda Point was created by filling subtidal areas, natural tidelands, marshlands, and sloughs with dredge spoils from the surrounding San Francisco Bay, Seaplane Lagoon, and Oakland Inner Harbor.

The RCRA Corrective Actions will be conducted at IWTPs 25 and 32 which are located on Environmental Baseline Survey (EBS) Parcels 27 and 66, respectively (Figure 1, "Site Location Map, IWTPs 25 and 32"). Brief descriptions of each site are provided in the following subsections.

2.2 Industrial Waste Treatment Plant No. 25

IWTP 25 is located on Parcel 27 in the southern central section of Alameda Point (EBS Zone 7, Corrosion Control and Aircraft Testing Zone). The EBS, performed by IT Corporation, Phase I site inspection and information provided by Naval Aviation Depot (NADEP) indicated that there are currently seven buildings (Building 25, 25A, 451, 494, 595, 622, and 623) on Parcel 27 (ERM-West, 1995). The majority of these facilities supported aircraft paint and coating removal activities.

Stripping and corrosion control operations occurred in Building 25, (NADEP Corrosion Control Facility), formerly known as the Naval Aircraft Refit Facility (NARF) Corrosion Control. Building 25A (IWTP 25) provided waste treatment for paint and coating waste streams from Building 25. Operation of processes within Building 25 were terminated before base closure in 1997. Operations continued at Building 25A (IWTP 25) until 1999, treating fluid waste from base closure and cleanup activities. The IWTP ceased operations before July 1999.

Constructed in 1987, Building 25 is a 54,500 square foot steel warehouse-style structure. The floor of Building 25, (NADEP Corrosion Control Facility) contains six concrete work bays. Each work bay was used to perform one of three corrosion prevention processes including plastic media (PMB) grit stripping, chemical stripping, and washing. A trench system collected rinsate from the work bays and transported it to Building 25A (IWTP 25) located south of Building 25.

The rinsate from the processes at Building 25 reportedly contained halogenated and nonhalogenated organics, metals, petroleum products, and corrosives.

Building 25A (IWTP 25) was built in the late 1980's. This building housed the wastewater treatment facility and laboratory, which processed effluent from Building 25. Wastewater from corrosion control operations at Building 25 contained paint skins, phenol, oil and grease, other organics, and metals. Chemicals used or generated in IWTP 25 during wastewater treatment included paint sludge, wastewater containing paint stripper and anticorrosive, treatment sludge, sulfuric acid, phosphoric acid, and small quantities of phenol, ammonia, phosphate, mercury waste, chromium, and spent methylene chloride waste. The wastewater was processed through IWTP 25, wherein paint chips were filtered out; phenol was biologically reduced; organics were absorbed in carbon or destroyed; oil and grease were separated; and chromium was reduced and precipitated. The precipitated sludge was dewatered and disposed of off site. The wastewater was discharged under permit via the Station's industrial sewer system to the East Bay Municipal Utility District's (EBMUDs) wastewater treatment plant. The treatment processes associated with IWTP 25 are described in the following section.

2.2.1 Process Description

Information collected during the EBS site inspection (IT, 1998) indicates that IWTP 25 had the capacity to treat approximately 5,000 gallons of rinsate water per day. According to the facility hazardous waste permit, the components of IWTP 25 included a paint screen and hopper; two equalization tanks, chrome treatment units, two clarifiers, neutralization units, two bioreactor units, a sludge thickener, two carbon units, total toxic organic (TTO) reduction units, a sampling well, and a filter press. After the paint sludge was removed, it was accumulated on-site, pending off-site disposal. The wastewater was pumped into an initial holding tank and then through a series of treatment tanks. Treated wastewater was discharged to the industrial waste sewer. The resultant solid, a pressed metal/bacteria sludge, accumulated on-site and later was disposed of at licensed disposal facilities. IWTP 25 had a system of shallow concrete trenches equipped with pumps, in which process overflow liquid collected and circulated back into the main tank.

Potential compounds of concern were determined through a review of the processes at the facility, review of previous investigations, and reported incident releases. Potential compounds of concern at IWTP 25 include phosphoric acid, sulfuric acid, methylene chloride, phenols, halogenated and nonhalogenated organics, metals (chromium, mercury, and lead in particular), and corrosives.

2.3 Industrial Waste Treatment Plant No. 32

IWTP 32 is located in Parcel 66 (Figure 1), in the central section of Alameda Point (Zone 13, Central Light Industrial Zone). IWTP 32 is located in Building 32, occupying the western section of the building (Figure 1). Building 32 is a 34,500 square foot structure specifically designed to house plating shop and waste processing operations. Containment barriers in the structure were designed to prevent uncontrolled releases of chemicals to the environment. As part of the secondary containment system at IWTP 32, the entire floor (ground and basement) is underlain by a 60-mil thick synthetic liner.

Building 32 was Alameda Point's newest electroplating shop at the time of base closure and was constructed in 1990 for plating and metal finishing operations. Other processes conducted inside Building 32 included electric drying in ovens, welding, ion vapor deposition, chrome anodizing and plating, degreasing, abrasive blasting, chromium/magnesium/aluminum finishing, cadmium conversion coating, and acid etching and stripping. These processes typically involved the use or generation of chemicals and waste including mixed metals, cyanide waste, cadmium waste, chromium, acids, alkalis, chromium waste, and nickel precipitates. According to the Parcel 66 Parcel Evaluation Plan (ERM-West, 1995), metal degreasers, including volatile organic compounds (VOCs), sodium salts, reactives, corrosives, and lubricants, have been stored in Building 32 since its construction. Disposal of waste process chemicals was accomplished by treatment at IWTP 32 followed by discharge into the sanitary sewer.

The treatment processes associated with IWTP 32 are described in the following section.

2.3.1 Process Description

According to the Facility Hazardous Waste Permit, wastewater generated in this shop contained aluminum, cadmium, chromium, copper, cyanide, lead, nickel, silver, tin, and zinc, as well as acidic and caustic water (DTSC, 1993). The treatment system components included nickel and cadmium waste tanks, cadmium and nickel filters, acid alkali waste collection and neutralizing tanks, chromium waste sump, chromium waste tanks, cadmium waste collection tanks, cyanide waste sump, cyanide waste tanks, mixed metals tanks, holding tank, neutralizing tank, clarifier, and a filter press. Wastewater was batch treated. Hazardous waste sludge was generated from the wastewater treatment process. The precipitated sludge was dewatered and disposed of off site. The treated effluent was discharged under permit via the Station's industrial sewer treatment system to the EBMUD wastewater treatment plant. Before the effluent was discharged, cyanide in the effluent was destroyed and pH was balanced.

Potential compounds of concern were determined through review of processes at the IWTP 32. Potential compounds of concern include aluminum, cadmium, chromium, copper, lead, nickel, silver, tin, zinc, VOCs, semivolatile organic compounds (SVOCs), and acids and bases (cyanides).

3.0 Previous Investigations

IT Corporation (IT) performed RCRA closure investigation sampling under Delivery Order (DO) 044 in accordance with the RCRA Part B Permit Closure Subsurface Investigation Work Plan Industrial Waste Treatment Plant #25 and #32, NAS Alameda (IT, 1996a and b). This sampling was performed in conjunction with EBS Phase 2 field investigations. The EBS process was a series of base-wide investigations that assessed the environmental impacts of base operations. Sampling tasks associated with the RCRA closure investigation of IWTPs 25 and 32 were conducted in accordance with the general intent of the Shell Work Plan (ERM West, 1994). This report incorporates relevant data from the previous EBS Phase 2A and 2B investigations (IT, 1998).

The following sections present a summary of previous investigations in supporting the RCRA Part B Permit Closure at IWTPs 25 and 32. More details can be found in the following reports:

1. Draft, RCRA Part B Permit Closure, Subsurface Investigation Report Industrial Waste Treatment Plant #25, Alameda Point, Alameda, California, IT Corporation, DO No. 44, February 2000

2. Draft, RCRA Part B Permit Closure, Subsurface Investigation Report Industrial Waste Treatment Plant #32, Alameda Point, Alameda, California, IT Corporation, DO No. 44, February 2000

3.1 IWTP 25 Investigation Results

The objective of the RCRA closure investigation (IT, 2000a) for IWTP 25 was to provide documentation to support the RCRA Part B Permit closure. The RCRA closure investigation was designed to determine whether activities at IWTP 25 resulted in a release of hazardous constituents to soil or groundwater. The February 2000 Report documents the RCRA closure investigation of IWTP 25 conducted in July 1999, incorporates relevant EBS data, and describes the environmental condition of the property. Evaluation of data from the EBS Phase 2A investigation suggested that additional investigation was not warranted in the area of IWTP 25. However, because investigation criteria for RCRA differ from EBS, a specific RCRA closure investigation was performed to support the Part B Permit closure (IT, 2000a).

This RCRA Part B investigation included collection of three surface soil samples, nine subsurface soil samples, and six groundwater samples. Samples were analyzed for Contract Laboratory Program (CLP) metals, CLP VOCs, CLP SVOCs, hexavalent chromium, and pH. Soil samples collected during the earlier EBS Phase 2A investigation were integrated into the evaluation of IWTP 25. Data generated for the Installation Restoration (IR) Program investigations conducted near IWTP 25 were not relevant to the IWTP; therefore, IR Program data were not included in the analysis.

Hexavalent chromium was detected at elevated concentrations in subsurface soil sample 027T-0011 (1.0 feet to 1.5 feet) at 1.2 milligrams per kilogram (mg/kg) and subsurface soil sample 027T-0003 (4.0 feet to 6.0 feet) at 0.72 mg/kg (IT, 2000a). These concentrations exceeded the 1998 EPA Region 9 Preliminary Remediation Goal (PRG) (0.20 mg/kg). Hexavalent chromium was not detected in any groundwater sample. The two locations where hexavalent chromium was detected are separated by approximately 100 feet. The absence of chromium detections between these samples suggests that the occurrence of hexavalent chromium is isolated. Based on these observations, the occurrence of hexavalent chromium in the environment appears to be isolated both vertically and laterally. Low levels of mercury (2.6 mg/kg) were detected in one soil sample collected within the boundary of IWTP 25 at concentrations exceeding the Alameda Point background level (0.34 mg/kg). However, mercury did not exceed the residential PRG for "Mercury and Compounds" (22 mg/kg). Concentrations of metals in groundwater samples collected during the RCRA closure investigation of IWTP 25 were below 1998 EPA Region 9 PRGs and Alameda Point background levels.

Concentrations of SVOCs detected in soil and groundwater samples were below 1998 EPA Region 9 PRGs. VOCs were not detected in soil. Chloroform was the only VOC detected (at concentrations ranging from 0.5 to 1.3 micrograms per liter [µg/L]) in groundwater collected at IWTP 25 that exceeded the 1998 EPA Region 9 PRG of 0.16 µg/L. Chloroform is commonly found in drinking water supplies as a result of the chlorination process. The elevated level detected is potentially present as a result of leaking drinking water supply lines. The presence of chloroform in groundwater does not necessarily suggest that a release has occurred from IWTP 25. Because chloroform was not detected in soil, was detected at concentrations only slightly above the PRG, and chemicals associated with chloroform have not been identified as being used at IWTP 25, chloroform was not considered an environmental concern at IWTP 25. Concentrations of other VOCs detected in groundwater collected from Parcel 27 were below 1998 EPA Region 9 PRGs.

Based on the analytical data, impact to soil and groundwater from IWTP 25 appears to be minimal. Concentrations of hexavalent chromium, although slightly exceeding 1998 EPA Region 9 PRGs, did not appear to represent a health risk from direct exposure because concrete and asphalt cover the area of IWTP 25. Exceedances of comparison values in groundwater are restricted to chloroform. Based on conditions where chloroform commonly occurs, the slightly elevated concentrations detected, and because chloroform was not a chemical related with operations at IWTP 25, chloroform was not considered an environmental concern at IWTP 25.

3.2 IWTP 32 Investigation Results

The objective of the RCRA closure investigation for IWTP 32 was to provide documentation to support the RCRA Part B Permit closure. The RCRA closure investigation was designed to determine whether activities at IWTP 32 resulted in a release of hazardous constituents to soil or groundwater. The February 2000 report prepared by IT documents the RCRA closure investigation of IWTP 32 conducted in July 1999, incorporates relevant EBS data, and describes the environmental condition of the property (IT, 2000b).

Data from the EBS Phase 2 and the IR Program investigations also provide data relevant to the IWTP 32 RCRA closure investigation. None of the compounds detected in the EBS Phase 2A samples exceeded the 1998 EPA Region 9 PRGs or Alameda Point background levels.

As part of the subsurface RCRA closure investigation, seven subsurface soil, and seven groundwater samples were collected. The samples were analyzed for CLP metals, CLP VOCs, CLP SVOCs, hexavalent chromium, and pH. Elevated concentrations of metals were not detected in any of the samples collected. Hexavalent chromium was detected at a low concentration in subsurface sample 066T-0005 (0.11 mg/kg), collected from beneath the cadmium tanks in the northwest corner of Building 32 (IT, 2000b). Hexavalent chromium was also detected at low concentrations in sample 066T-0013 (0.10 mg/kg) and its duplicate 066T-0016 (0.08 mg/kg), collected from beneath the final neutralization tank near the southwest corner of Building 32. These detections are below the PRG (0.2 mg/kg). Hexavalent chromium was not detected in groundwater. Chloroform exceeded the PRG (0.16 µg/l) in three groundwater samples at concentrations ranging from 0.40 to 0.50 µg/l. Chloroform is commonly found in drinking water supply as a result of the chlorination process. The elevated levels detected are potentially present as a result of leaking drinking water supply lines. The presence of chloroform in groundwater does not necessarily suggest that a release has occurred from IWTP 32.

Several other VOCs were detected at low concentrations in soil and groundwater collected beneath Building 32 and the IWTP. However, none of these VOCs exceeded comparison values. Methylene chloride, a common laboratory contaminant, was detected at low concentrations (below the residential PRG) in numerous soil and groundwater samples. The common occurrence of methylene chloride does not suggest a release has occurred from IWTP 32. It should be noted that IWTP 32 is located with the northeast boundary of IR Site 5. The groundwater beneath IR Site 5 is contaminated with, among other things, VOCs as a result of IR Site 5 operations and is currently being investigated and remediated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program.

Based on the analytical data, impact to the subsurface from IWTP 32 appears to be minimal. The only constituent present in the subsurface that is potentially related to the operation of IWTP 32 is hexavalent chromium. Hexavalent chromium is present at low concentrations at two isolated locations in soil below IWTP 32.

3.3 Previous Decontamination, Sampling, and Testing

In 1999, all tanks and units (permitted and non-permitted) scheduled for closure at IWTPs 25 and 32 were steam cleaned, triple rinsed, and wipe samples were collected for certifying closure. Subsequently, the results of these samples were questioned by DTSC due to bias in the type of wetting agents (methylene chloride for IWTP 25, and nitric acid for IWTP 32 were used in lieu of deionized water) used for collecting the wipe samples. Since then, the Navy has made a decision to dismantle and dispose of the units for achieving RCRA closure. The only testing to be conducted at this time is what is required by recyclers and disposal facilities as appropriate and necessary for disposal.

3.4 Additional Soil and Groundwater Confirmation Sampling

During a recent RCRA team meeting (August 4, 2003), DTSC directed the Navy to collect additional soil and groundwater confirmation samples from the subsurface directly beneath IWTP 25. As a comment on the Closure Plan Amendment for IWTP 32, prepared by TTEMI, DTSC requested additional soil sampling at IWTP 32 along the eastern and southern sides of Building 32. For the remainder of IWTP 32, DTSC agreed that previous data (1999) would be adequate and no additional soil or groundwater data would be necessary. Further, the facility floor at IWTP 32 is underlain by a synthetic 60-mil liner serving as a secondary containment, and puncturing the liner for collecting soil and groundwater chemical data would not be prudent. The following section describes the protocol for the additional soil and groundwater confirmation sampling to be conducted as part of this WP at IWTPs 25 and 32.

4.0 Subsurface Confirmation Sampling at IWTPs 25 and 32

The objectives of the RCRA Part B Closure Subsurface Confirmation Sampling are to assess whether hazardous constituents from IWTPs 25 and 32 have been released into the subsurface (soil and groundwater) and to establish an environmental condition of the property. This WP provides a sampling strategy to fulfill these objectives.

4.1 Chemical Constituents of Concern

Based on a review of processes at IWTP 25, a review of previous investigations, and reported incidents of spills/releases, the potential compounds of concern at IWTP 25 include phosphoric acid, sulfuric acid, methylene chloride, phenols, halogenated and nonhalogenated organics, metals (chromium and lead in particular), and corrosives.

4.2 Soil and Groundwater Confirmation Sampling at IWTP 25

Both soil and groundwater samples will be collected from the subsurface of IWTP 25. This will be accomplished by advancing vertical hand augers or boreholes through the foundation slab of the facility. Figure 2, "Soil, Groundwater and Concrete Chip Sample Locations, RCRA Corrective Actions at IWTP 25," shows the locations of seven proposed soil and groundwater boring locations at IWTP 25. In accordance with DTSC agreements at the August 4, 2003 RCRA meeting, these locations are all located in the drainage trenches as shown on Figure 2.

In accordance with DTSC agreements during the May 7, 2003 and August 4, 2003 meetings, at IWTP 25, only those locations that did not use Encore soil sampling collection methods for soil VOCs in the 1999 investigation (IT, 2000) will be re-sampled using Method 5035 protocols. All other soil and groundwater sampling results from the 1999 investigation are acceptable and no further sampling is required (DTSC, 2003) at IWTP 25. A total of nine locations are proposed for soil VOC sampling using Method 5035 at IWTP 25 (Figure 2).

In addition to this soil sampling, soil samples will also be collected from the vicinity of the buried pipe that conveyed waste from Building 25 to IWTP 25 (Figure 2). The exact location of the pipe will be sounded and tagged in the field during utility surveys based on the visible aboveground end point near the equalization tanks at IWTP 25. From each of the five proposed sample locations shown on Figure 2, two soil samples (from depths of 1 and 3 feet below the bottom of the pipe) will be collected after the overburden is uncovered. These soils will be tested for analytes in accordance with the approved SAP (Appendix A).

The soil samples at the previous (1999) locations will be collected using a hand auger as appropriate. Samples will be collected from the same depth intervals (ranging from surface to approximately 4 feet below ground surface [bgs]) as was done in 1999. Please refer to the

Sampling and Analysis Plan (SAP) (Appendix A) for actual sample depths. The protocol for collecting soil and groundwater samples at the drainage trench locations will be as follows. First, the concrete floor will be cored with a concrete coring machine having a minimum diameter of 5-inches. Once the soil horizon is reached, a hand auger will be used to collect soil samples from depths of 0.5 to 1.0 feet and 4.0 to 4.5 feet bgs. At each soil sampling location of IWTP 25, a galvanized steel well point will be driven for groundwater sampling. The well point will be driven below the last soil sample location and a groundwater sample will be collected using a peristaltic pump and tubing. The well will be purged for sediment prior to sampling. The groundwater samples will be filtered and analyzed for chemicals in accordance with the SAP. Please refer to the SAP (Appendix A) for more details on the sampling methods, comparison values, and sampling protocol.

DTSC may collect field duplicate (split) samples for soil and groundwater at IWTP 25 at their discretion.

4.3 Soil Confirmation Sampling at IWTP 32

In accordance with DTSC requests, soils from the eastern and southern sides of Building 32 will be sampled to assess the release of contamination from IWTP 32. This will be accomplished by a vertical hand auger or a direct push geoprobe drill rig as appropriate. Figure 3, "Soil and Concrete Chip Sample Locations, RCRA Corrective Actions at IWTP 32," shows the locations of four (two each on the eastern and southern sides) proposed soil sampling locations at Building 32. At each location, three depths are proposed: 0 to 6 inches; 4 to 4.5 feet, and the groundwater interface. These depths may be modified in the field depending on the location of the groundwater table. All soil samples will be analyzed for chemicals in accordance with the SAP (Appendix A). Please refer to the SAP (Appendix A) for more details on the sampling methods, comparison values, and sampling protocol. DTSC may collect field duplicate (split) soil samples at Building 32 at their discretion.

Since IWTP 32 is located within the boundary of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Site 05, the analytical results for VOCs in soil will need to be compared to existing levels of VOC contamination that are known to be present at CERCLA Site 5. This comparison will provide additional information for determining the likelihood that IWTP 32 is a source of VOC contaminants in the groundwater.

4.4 Concrete Chip Sampling

In addition to subsurface soil and groundwater samples, concrete chip samples will be collected from the floors of IWTP 25 (7 samples from the floor, and 6 background samples) and IWTP 32 (27 samples from the basement floor, nine samples from the main floor, and six background samples).

For IWTP 32, an approximate 25-foot x 25-foot grid sampling protocol is proposed on the basement floor resulting in approximately 27 concrete chip samples (Figure 3). An additional five samples will be collected from the main floor in the vicinity of the fiberglass tank containment areas. Further, an additional four samples will be collected from random locations near the blue plating tanks located in the vicinity of the fiberglass tanks. The grid over the basement floor and the main floor concrete chip sample locations are shown on Figure 3. Six concrete chip samples will also be collected for background comparison purposes. The background samples will be collected from a visually-clean area on the first floor of IWTP 32, located in the vicinity of the tenant that currently occupies the facility. This location is at a sufficient distance from the plating and stripping vats and will serve as a representative location for background values of unstained concrete. Prior to sampling the basement floor at IWTP 32, the protective resin layer present on the concrete floor will be scarified and vacuumed with appropriate portable equipment. Concrete chip samples will be collected using a chisel and hammer as appropriate. Refer to the SAP in Appendix A for sample quantity and testing methodology.

At IWTP 25, concrete chip samples will be collected from the same seven drainage trench locations selected for soil and groundwater sampling as described in Section 4.2 (see Figure 2). Six concrete chip samples will also be collected for background comparison purposes. In an email dated July 15, 2003, DTSC suggested background samples be collected from the outer wall of perimeter berms and other such areas that are "least likely" to be have been impacted by facility operations. The locations of the background samples will be selected during field mobilization. Concrete chip samples will be collected using a chisel and hammer as appropriate. Refer to the SAP in Appendix A for sample quantity and testing methodology.

4.5 Sampling Procedures

RCRA Part B Closure sampling at IWTPs 25 and 32 will be conducted in accordance with the sampling procedures contained in the SAP (Appendix A). Standard operating procedures (SOPs) pertaining to the items below will be followed. The SOPs referenced in this section are part of the *IT Standard Quality Procedures and Standard Operating Procedures Manual* (IT, 2000c).

- Chain of custody
- Sample handling, packaging, and shipping
- Surface and shallow subsurface soil sampling
- Subsurface soil sampling while drilling
- Sampling equipment and well material decontamination
- Groundwater sampling

4.6 Data Reduction, Verification, and Reporting

All analytical data generated by the laboratory in support of this project will be reviewed prior to reporting to assure the validity of reported data. This internal laboratory data review process will consist of data reduction, three levels of documented review, and reporting. Review processes will be documented using appropriate checklist forms, or logbooks, that will be signed and dated by the reviewer.

4.6.1 Data Reduction

Data reduction involves the mathematical or statistical calculations used by the laboratory to convert raw data to the reported data. The laboratory will perform reduction of analytical data as specified in each of the appropriate analytical methods and laboratory SOPs. For each method, all raw data results will be recorded using method-specific forms or a standardized output from each of the various instruments.

All data calculations will be verified and initialed by personnel both generating and approving them. All raw and electronic data, notebook references, supporting documentation, and correspondence will be assembled, packaged, and stored for a minimum of 10 years for future use. All reports will be held client confidential. If the laboratory is unable to store project-related data for 10 years, then it is the responsibility of the laboratory to contact Shaw to make alternative arrangements.

4.6.2 Laboratory Data Verification and Review

The laboratory analyst who generates the analytical data will have the primary responsibility for the correctness and completeness of data. Each step of this verification and review process will involve the evaluation of data quality based on both the results of the quality control (QC) data and the professional judgment of those conducting the review. This application of technical knowledge and experience to the evaluation of data is essential in ensuring that data of known quality are generated consistently. All data generated and reduced will follow well-documented in-house protocols.

4.6.2.1 Level 1: Technical (Peer) Data Review

Analysts will review the quality of their work based on an established set of guidelines, including the QC criteria established in each method, in the SAP, and as stated within the laboratory quality assurance (QA) Manual. This review will, at a minimum, ensure that the following conditions have been met:

- Sample preparation information is correct and complete.
- Analysis information is correct and complete.
- Appropriate SOPs have been followed.
- Calculations are verified.
- There are no data transposition errors.

- Analytical results are correct and complete.
- QC samples are within established control limits.
- Blanks and laboratory control samples (LCSs) are within appropriate QC limits.
- Special sample preparation and analytical requirements have been met.

Documentation is complete, for example, any anomalies and holding times have been documented and forms have been completed.

4.6.2.2 Level 2: Technical Data Review

A supervisor or data review specialist whose function is to provide an independent review of data packages will perform this review. This review will also be conducted according to an established set of guidelines and will be structured to verify the following finding of Level 1 data review:

- All appropriate laboratory SOPs have been followed.
- Calibration data are scientifically sound, appropriate to the method, and completely documented.
- QC samples are within established guidelines.
- Qualitative identification of contaminants is correct.
- Manual integrations are justified and properly documented.
- Quantitative results and calculations are correct.
- Data are qualified correctly.
- Documentation is complete, for example, any anomalies and holding times have been documented and appropriate forms have been completed.
- Data are ready for incorporation into the final report.
- The data package is complete and complies with contract requirements.

The Level 2 review will be structured so that all calibration data and QC sample results are reviewed and all of the analytical results from at least 10 percent of the samples are checked back to the sample preparation and analytical bench sheets. If no problems are found with the data package, the review will be considered complete.

If any problems are found with the data package, an additional 10 percent of the sample results will be checked back to the sample preparatory and analytical bench sheets. This cycle will then be repeated either until no errors are found in the checked data set or until all data has been checked. All errors and corrections noted will be documented.

4.6.2.3 Level 3: Administrative Quality Assurance Data Review

The Laboratory QA Manager will review 10 percent of all data packages. This review should be similar to the review as provided in Level 2 except that it will provide a total overview of the data package to ensure its consistency and compliance with project requirements. All errors noted will be corrected and documented.

4.6.3 Data Reporting

This section details the requirements for data reporting and data package formats that will be provided by the laboratory.

4.6.3.1 Hard Copy Deliverables

All relevant raw data and documentation, including (but not limited to) logbooks, data sheets, electronic files, and final reports, will be maintained by the laboratory for at least 10 years. The laboratory will notify Shaw 30 days before disposal of any relevant laboratory records.

Shaw will maintain copies of all Chain-of-Custody (COC) Forms until receipt of the laboratory report. Laboratory reports will be logged in upon receipt and filed in chronological order. If necessary based on project Data Quality Objectives (DQOs), the second copy of the report will be sent for third-party data validation.

The data deliverable requirements for this project will be standard laboratory package with quality control summary.

4.6.3.2 Electronic Deliverables

The electronic data deliverable (EDD) will be in ASCII format. The analytical laboratory will follow the requirements stated in the Laboratory Interface Document for the Analytical Laboratory EDD. At project closeout, Shaw will submit a Navy Electronic Data Transfer System compatible electronic file to the Navy.

The laboratory will certify that the EDD and the hard copy reports are identical. Both the EDD and the hard copy will present results to two or three significant figures. For inorganic results, two significant figures will be used for results that are less than 10, and three significant figures will be used for results that are greater than 10. For organic results, one significant figure will be used for results that are less than 10, and two significant figures will be used for results that are greater than 10. The EDD for each sample delivery group (SDG) will be due at the same time as the hard copy; 14 days after sample delivery to the laboratory.

Field information (e.g., date and time collected, sample identification, etc.) will be entered directly into the main database from the COC form or uploaded from electronic files generated in the field.

Upon receipt by the Shaw Environmental, Inc. Management System Data Manager, electronic data will be uploaded into a temporary access database. The uploaded data will be printed and proofread relative to the hard copy submitted by the laboratory. The reader will also check for irregularities in analyte identities, concentrations, and units. The uploaded data will also be processed to compare the fields against a list of required values. If any errors are returned by the program, the file will be manually edited or regenerated by the laboratory. If no errors are returned, the data will be uploaded into the main database. The laboratory database will be merged with the field database, and reports will be generated from the merged database.

4.7 Data Validation

All soil and groundwater confirmation samples will be validated by an independent data validation company. The data will be validated at 90 percent EPA Level III and 10 percent EPA Level IV according to the requirements of SWDIV Environmental Work Instruction 3EN2.1 (SWDIV, 2001). Samples collected for waste characterization and concrete chips will be reviewed by a Shaw Project Chemist (refer to the SAP for details). The validation will be in accordance with the EPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA, 2002), EPA *Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA, 1996), and the QC criteria specified in this document.

Data will be validated and flagged with the following data qualifiers:

- *J qualifier* denotes the analyte was positively identified, but the associated numerical value is estimated.
- *U qualifier* denotes the analyte was analyzed for, but not detected. The associated numerical value is at or below the reporting limit.
- *R qualifier* denotes the data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

4.8 Data Review

The Project Chemist will review the laboratory data packages for waste samples to establish that holding times for extraction and analysis, and internal QC check requirements have been met and to establish data usability.

5.0 Site Preparation

Site preparation work shall consist of the following tasks:

- Mobilizing personnel and equipment to the project location
- Setting up temporary support facilities (if necessary)
- Implementing preparatory measures with respect to site health and safety, construction quality control, environmental protection, waste management procedures, and site security controls
- Delineating work zones, the decontamination area, and staging and storage areas

5.1 Mobilization

Personnel, construction equipment, testing equipment, and supplies will be mobilized to the site. Mobilization activities will include transportation of personnel and freight shipment of construction equipment and bulk supplies. Major construction equipment anticipated to be required include the following:

- Tools necessary for dismantling and demolition
- Pressure washers
- Bobcat or similar equipment
- Water truck or water buffalo
- End-dump trucks for disposal
- Pick-up trucks
- Crane and rigging if deemed necessary by the contractor

Additional construction equipment and hand tools may be utilized as needed. A minimum of five working day notice will be provided to DTSC prior to commencing any field activities.

5.2 Utilities

Utilities required for execution of project activities include the following:

- Electrical power
- Telephone/facsimile
- Radio communications
- Potable and nonpotable water
- Sanitary facilities

All anticipated utilities are either currently available or will be furnished at the construction site. Water for decontamination and dust control is anticipated to be obtained from nearby buildings or fire hydrants. A portable generator, if needed, will supply electrical power. Electrical power will be de-energized during demolition in areas around active aboveground and underground electrical conduits (lockout/tag-out).

Field personnel will be equipped with two-way radios, as necessary. Supervisory personnel will be equipped with cellular telephones, as necessary. Navy and regulatory personnel will be provided with a list of all pertinent telephone numbers, fax numbers, and e-mail addresses.

5.3 Decontamination Facilities

Equipment and personnel decontamination facilities will be set up at the two facilities. The personnel decontamination station will be set up at the contamination reduction zone (CRZ). The decontamination station will be lined with 20-mil polyethylene plastic sheeting, equipped with one or more pressure wash nozzles, and bermed and equipped with a sump pump to collect water. Decontamination facilities are discussed in detail within the Site Health and Safety Plan (SHSP) presented in Appendix B.

5.4 Site Management Activities

Site management activities include managing site security, protection of tenants, site layout, and staging areas.

5.4.1 Site Security

The entire work area (especially IWTP 25), demolition area, and staging areas will be bordered with temporary fencing, faced with enviro-netting. The actual working exclusion zone (EZ) around the demolition areas will be secured further with warning signs, barricades, and caution tape.

5.4.2 Building Protection

Efforts that will be taken to control dust generated during demolition of tanks and piping include fogging construction activities with water spray as necessary, covering containers, and covering loaded transport trucks with tarps if needed. Additional details about protection of tenants are provided in the SHSP (Appendix B) and Environmental Protection Plan (Section 8.0). In addition, precautions will be taken during all demolition activities to protect nearby tenants and occupants. This may include evacuations and/or conducting work on weekends when the buildings are not occupied.

5.4.3 Site Layout

The Site Superintendent, with the help of the Site Safety Officer, will establish appropriate work zones at the project site. A site EZ will be installed around the immediate vicinity of any ongoing demolition. Additional EZs will be established around localized demolition efforts and will move as the activities progress to allow for efficient operation of workers, equipment, and materials. More detailed descriptions of the EZs and CRZs are presented in the SHSP (Appendix B).

5.4.4 Material Stockpile Area

It is anticipated that debris and recovered scrap metal scheduled for disposal or recycling will be stockpiled prior to disposal. Staging will be contained within the fenced areas to be established at the site.

5.4.5 Site Traffic

Traffic layout and access to the facilities will be developed by the Site Superintendent prior to beginning fieldwork.

6.0 Removal of Tanks and Associated Waste Conveyance Piping

The following sections describe the construction activities associated with the demolition of tanks, other units, and associated waste conveyance piping at IWTPs 25 and 32. Tables 1 and 2 present a list of tanks and other units scheduled for closure for IWTPs 25 and 32, respectively. Note that other units, for example the scrubbers and vent stacks at IWTP 32, are present at these IWTP sites that are not scheduled for removal and closure at this time in accordance with DTSC guidance provided at the May 7, 2003 meeting.

It is anticipated that all tanks and other units as listed in Tables 1 and 2 will be dismantled and transported for disposal or recycling by a subcontractor specializing in this type of work. Since the work has not been subcontracted at this time, the procedures for demolition may vary from what is described in this section depending on the subcontractor chosen. This section, therefore, describes the steps required for demolition in general terms with more details to follow upon subcontractor selection and approval.

The tagging and removal of the associated waste conveyance piping will be performed by a qualified subcontractor.

6.1 Removal of Tanks and Other Listed Units

The following sections describe the proposed dismantling and demolition action of tanks and other units at IWTPs 25 and 32. The methods described below are general in nature, and may change depending on the subcontractor selected for performing this work.

IWTP 25 is an open-air facility, consisting primarily of steel and fiberglass tanks. A list of the tanks and equipment to be removed at IWTP 25 is shown in Table 1, "RCRA Part B Permitted and Non-Permitted Units at IWTP 25." Based on the age of IWTP 25, lead based paint may have been used at the facility. Suspected lead-based paint on tanks, equipment and pipes will be sampled prior to demolition. Paint chips will be collected from various areas around the facility and will be analyzed for lead using EPA Method 6010B. Shaw may choose to subcontract lead-based paint survey, sampling and abatement activities. The results from paint chip analysis will be used to determine disposal options. Since IWTP 25 is an open-air facility, rainwater may have accumulated in open tanks or vessels. If necessary, accumulated rainwater will be pumped out and combined with other site wastewater for disposal in accordance with the SAP.

IWTP 32 is an enclosed facility, consisting primarily of steel and fiberglass tanks and two in-ground concrete sumps. A list of the tanks and equipment to be removed at IWTP 32 is shown in Table 2, "RCRA Part B Permitted and Non-Permitted Units at IWTP 32." Based on the age of IWTP 32, lead based paint is not expected to be present on any equipment. However, if necessary for disposal, painted tanks, equipment or pipes may be sampled prior to demolition. Paint chips will be collected from suspect materials (if present) and will be analyzed for lead using EPA Method 6010B.

Two concrete sumps, chromium waste and cyanide waste, were observed to contain liquid during recent inspections. The sumps will be pumped out and cleaned prior to "in-place" closure. After cleaning, a sample of the final rinse water will be collected and will be analyzed for chromium (chromium waste sump) by EPA Method 6010B and cyanide (cyanide waste sump) by EPA Method 9010. Since the chemicals processed in these two sumps were incompatible, proper precautions must be taken to make sure that contents of these two sumps are not mixed at any time.

In agreements with DTSC personnel, some of the tanks present in the basement of IWTP 32 may alternatively be rendered unusable in lieu of removal. This could be accomplished by drilling holes in the tanks as appropriate. This action will prevent minimal disruption of the tenant (from noise and dust) that occupies a portion of the main floor of IWTP 32 directly above the basement. These tanks are highlighted on Table 2.

The following steps will be used to dismantle and demolish the tanks:

1. Visual inspection of all tanks and units as listed in Tables 1 and 2
2. Spot abatement for LBP at IWTP 25 if necessary
3. Disassembly and demolition of tanks and other units
4. Recycling and/or disposal of the scrap metal and fiberglass as appropriate
5. In-place closure of the chrome and cyanide sumps at IWTP 32

6.1.1 Visual Inspection

The Site Superintendent and the Project Engineer will visually inspect each tank and unit for its cleanliness and make an assessment for direct recycling and/or disposal without further cleaning and/or sampling. Entry into the tank may be required. If entry is required, proper confined space entry procedures will be followed as detailed in the SHSP (Appendix B). If the tank is visually clean, it will be disposed of at an appropriate facility without any further cleaning or sampling. Steel and metal may be recycled as appropriate. If the tank is visually contaminated, it will be decontaminated prior to disposal. Decontamination will include flushing with clean potable water as directed by the Site Superintendent. If necessary, the interior walls of the tanks may also be hydroblasted to remove visible contaminants that have adhered to the walls. All rinse water will be managed and disposed of in accordance with the SAP to an appropriate facility. Once the tanks are decontaminated, wipe samples will be taken for disposal profiling in accordance with the SAP. Based on recent discussions with local disposal facilities, no "coupon" sampling and analysis is necessary for any of the tanks.

6.1.2 Spot LBP Abatement at IWTP 25

Spot abatement will be required only if obvious signs of flaking or peeling LBP is observed during visual inspection. If the LBP is intact on the tank, no abatement will be required prior to disposal.

Suspected lead-based paint on tanks, equipment and pipes will be sampled prior to demolition. Paint chips will be collected and analyzed for lead using EPA Method 6010B. Testing will be conducted in accordance with the SAP. Spot abatement of LBP would be required to facilitate dismantling and demolition of the tanks prior to disposal. Spot abatement would involve removing LBP from areas that would be cut to minimize risks of uncontrolled exposure to lead particulates or fumes during disassembly. Any loose or peeling LBP will also be removed at this time. Paint can be removed by using hand-powered tools applied directly to the painted surface to remove the coating by a reciprocating or rotating action. Examples of tools that may be used are rotary peening machines, needle guns, water-powered washers, and hand scrapers. Alternatively, abatement activity could involve the chemical application of acidic or caustic agents to the surface to dissolve the paint. Paint chips and dissolving agents would be removed or collected on a plastic sheet placed beneath or around the tank(s) and drummed for disposal to a Class 1 facility. Bare metal surfaces will be wiped clean with absorbent cloths and power washed (if necessary) prior to cutting the metal pieces for disassembly.

6.1.3 Tank Disassembly

The tanks and equipment will be cut apart using torches or pneumatic cutting tools and lowered to the ground with a crane and rigging (for large tanks and units at the IWTPs) as directed by the subcontractor. Other heavy equipment may also be used to handle the large pieces. Units can also be removed without breaking up into smaller pieces if deemed appropriate and practical by Shaw with input from the subcontractor. To ensure safety of workers and adjoining property, a complete hazard analysis will be completed once the type and size of equipment is determined. This analysis will be completed by the Health and Safety Specialist and the Site Superintendent prior to construction. Once on the ground, the large metal pieces will be cut, using hydraulic shears or cutting torches, into smaller pieces for easy transport and disposal to a disposal facility. The demolition subcontractor will determine the final size of the pieces. The ground surface will be protected with a layer of plastic sheeting at all times.

6.1.4 Disposal of Steel and Fiberglass Tanks

The steel from all metal tanks without LBP would be transported to a local scrap yard for recycling. Scrap yards prepared to accept the steel are located in both Oakland and Richmond, California (5 miles and 15 miles, respectively, from Alameda Point). Steel scrap yards will sell the steel to mills to melt in furnaces for future use. The furnaces are equipped with engineering controls for mitigating impacts relating to melting lead-coated steel during the recycling process.

The fiberglass tanks will be disposed of at a Class III facility. Steel tanks containing intact LBP or those that require spot abatement will not be recycled but will be disposed of at an appropriate Class II facility consistent with California regulations. LBP from spot abatement activities will be disposed of at a Class I facility.

6.1.5 Closure of Sumps at IWTP 32

Two concrete sumps, chromium waste and cyanide waste, located in the basement of IWTP 32, were observed to contain liquid during recent inspections. The liquid observed in the chromium waste sump was generated by the upstairs tenant from washing down the floor upstairs and squeeging the washwater through the grated floor to the basement below. The tenant, subsequently, had the liquid pumped out and disposed of. Any water remaining in the sumps at the time of closure activities will be tested, drained and collected in temporary storage tanks for testing prior to disposal into a public-owned treatment works. Testing will be conducted in accordance with the SAP. The Site Superintendent will direct the plumbing necessary to achieve the removal of liquids from the tanks.

After all the accumulated liquids are removed, the sumps will be cleaned prior to "in-place" closure. After cleaning, a sample of the final rinse water will be collected and will be analyzed for chromium (chromium waste sump) by EPA Method 6010B and cyanide (cyanide waste sump) by EPA Method 9010. The sumps will then be backfilled with concrete for "in-place" closure. Since the chemicals processed in these two sumps were incompatible, proper precautions must be taken to make sure that contents of these two sumps are not mixed at any time.

6.2 Concrete Foundations and Subsurface Features

It is not currently anticipated that any of the concrete foundations or any other supporting structures will be removed or demolished as part of RCRA closure. It is assumed that all general debris generated as part of the dismantling and demolition process can be disposed of as nonhazardous construction debris to a Class II facility.

6.3 Waste Conveyance Piping

As part of decontamination efforts completed in 1999, all waste conveyance piping (mostly polyvinyl chloride [PVC]) was steam cleaned and triple rinsed in preparation for RCRA closure. All waste conveyance piping scheduled for removal will be tagged by subcontractor personnel prior to dismantling. Even though the scrubber and vent stack units are not scheduled for removal, the waste conveyance piping to and from these units will be tagged and removed for disposal to an appropriate facility. Pipes will be tagged from the tanks and traced back to the source of waste as far as practical. Also, prior to dismantling, the pipes will be checked for liquid contents that may be present from prior decontamination efforts. Holes may be drilled along the pipes to check for fluids. All pipes will be dismantled only after all contents have been drained and managed using appropriate protocols as directed by the Site Superintendent. A layer of plastic sheeting will be placed on the ground surface prior to dismantling any pipes. This will protect the ground surface from any residues or contaminants that may be present in the pipes. All pipe pieces will be stored on plastic sheeting prior to disposal. All residues and contaminants will be handled and managed appropriately prior to disposal. It is currently anticipated that all waste conveyance piping and associated residues and contaminants will be disposed of at a Class I facility without any profiling.

6.4 Closure Report

Post-construction activities are anticipated to be limited to preparation of a closure report. The closure report will be prepared to document the activities described in this Work Plan. Included in the report will be a summary of the work completed and waste characterization (if any) and confirmation sampling results (for soil, groundwater, and concrete chips), a summary of safety and health monitoring results, and the final quantities of materials disposed of off-site.

7.0 Investigation-Derived Waste Management

The purpose of this section is to provide the project field team with guidance for the proper handling, profiling, and disposal of the investigation-derived waste (IDW). A small amount of IDW will be generated through the execution of this project. All waste disposal will be coordinated through the Shaw Transportation and Disposal Coordinator; however, a Navy representative will sign all waste disposal manifests as generator.

7.1 Generation of Investigation-Derived Waste

The waste streams that will be generated during the investigation process are:

- Soil cuttings from hand augering activities resulting from soil sampling
- Rinsewater from tank decontamination may be generated if some of the tanks require further cleaning
- Resin coating material resulting from scarification of the basement floor at ITWP 32
- Personal protective equipment (PPE) and generally-contaminated site waste/debris

Efforts should be taken by the field team, whenever possible, to minimize the amount of overall generation of IDW while maintaining full integrity of the project investigation DQOs.

7.2 Waste Handling

Investigation-derived waste will be handled, stored, and profiled in accordance with all local, state, and federal regulations. Care will be taken to document, collect, handle, and store the IDW in a neat and organized fashion that is compliant with applicable regulations.

7.2.1 Soil Cuttings, Rinsewater from Tank Decontamination, and Resin Coating

Soil cuttings, tank decontamination wastewater (if generated), and scarified resin coating will be stored in U.S. Department of Transportation (DOT)-approved 55-gallon drums, or in a secure high-density polyethylene storage tank. All drums placed in interim storage will be closed and secured at the completion of each filling event. Drums that are completely filled in the field will be closed and secured when completely filled. All drums of waste material will be placed in a common secured area at the end of each day. If a storage tank is used it will be staged at a common secured area.

7.2.2 Personal Protective Equipment and General Site Waste/Debris

Personal protective equipment and generally contaminated site waste will be stored in DOT-approved 55-gallon drums. All drums of waste PPE will be placed in a common secured area at the end of each day. Uncontaminated general site waste will be disposed of as general refuse.

7.3 Interim Waste Storage

The IDW generated from this project will be stored at a secure location on the site that has been approved by the Navy. Waste will be cataloged and recorded so as to avoid interim storage that exceeds 90 days – prior to waste categorization.

7.4 Waste Profiling

The water waste streams will be characterized through the collection and analysis of various waste characterization samples. The specific analyses for profiling specific media are detailed in the SAP (Appendix A). Following receipt of the analytical results, from a state-certified analytical laboratory, the wastes will be categorized and profiled for disposal under a manifest prepared by the Navy Environmental Compliance Manager.

The PPE and contaminated general site waste will be profiled as such, and will likely be disposed of as a solid waste.

7.5 Disposal

Following characterization and profiling, the waste will be manifested for off-site disposal or recycling. All disposal of wastes, or recycling of such wastes, will occur only at U.S. Environmental Protection Agency approved facilities. The Navy Environmental Compliance Manager will sign all manifests as generator. All subcontractors utilized for transportation and/or disposal will posses all applicable state and federal permits, certifications, and licenses that are required to legally perform the requested tasks.

7.6 Documentation and Reporting

The final results of the waste profiling, classification, and disposal will be incorporated and documented in the closure report prepared following completion of removal activities.

8.0 Environmental Protection Plan

This Environmental Protection Plan (EPP) presents Shaw's methods of protecting environmental resources during fieldwork activities and post-removal restoration and cleanup, which are conducted in conjunction with the work described in this WP. The EPP was prepared for removal of aboveground wastewater treatment tanks and associated waste conveyance piping within IWTPs 25 and 32, that are located in Parcels 27 and 66, respectively, at Alameda Point.

For the purpose of this project, environmental protection is defined as maintaining the environment in its current state and enhancing or restoring the appearance of disturbed sites after sampling and construction activities are completed. This EPP addresses protection of air, water, and land resources. It also addresses management of noise, visual aesthetics, natural, historical, and archeological resources, and liquid and solid wastes. The Shaw Project Manager will implement this EPP so that all work is performed in a manner that minimizes the pollution of air, water, and land resources and complies with federal, state, and local regulations.

The majority of this EPP pertains to the two sites addressed in this WP; any site-specific concerns will be addressed in individual sections.

8.1 Special Status Species and Habitat

Photographs of existing conditions at Parcels 27 and 66 will be submitted to the Navy prior to the start of any fieldwork. The photographs will document pre-deconstruction conditions at these sites. The Navy has determined that there are no sensitive habitats within the proposed work areas. Parcel 25, adjacent to Parcel 27, is an area that provides suitable habitat for threatened and endangered species, however, field activities on Parcel 27 are not anticipated to directly encroach into Parcel 25 boundaries.

8.2 Environmental Protection

IWTP 25 is within an open space and IWTP 32 is enclosed within Building 32. There are no regulations or permits required for any of the planned activities. Each site will require adherence to site-specific environmental protection as appropriate for each location.

8.2.1 Regulations and Permits

Consistent with Navy exemptions as the lead agency for remediation activities at the site, all work will be conducted in compliance with the substantive requirements of federal, state, and local applicable or relevant and appropriate requirements (ARARs). The Shaw Project Manager will verify that all work is performed accordingly.

All hazardous wastes will be characterized and disposed of in accordance with appropriate federal and state regulations (i.e., RCRA and Title 22 of the California Code of Regulations [22 CCR]). Any hazardous waste generated by the remedial action will be managed in accordance with 22 CCR 66262.10-57. As required, hazardous wastes will be adequately characterized and manifested for off-site disposal at a RCRA permitted hazardous waste disposal facility.

Air resources will be protected in accordance with the Bay Area Air Quality Management District (BAAQMD). Endangered species and threatened species will be protected in accordance with the Endangered Species Act (Endangered Species Act 7 United States Code (U.S.C.) 136; 16 U.S.C. 460 et seq [1973]) and related regulations and the California Endangered Species Act (California Fish and Game Code). There are no endangered species or threatened species located in the planned work areas for this project.

8.2.2 Protection of Air Resources

Deconstruction activities associated with this project will be conducted in a manner that minimizes the release of airborne particulates within and outside the project boundary. Air emissions and dust and particulate control will be practiced at both parcels according to the requirements described below.

Dust Control and Particulate Control

The disassembly and removal procedures are designed to control and minimize particulate emissions. Work will be performed in accordance with applicable California and Federal air pollution regulations. Control of fugitive particles will involve dust control measures, such as watering down dry or barren areas and roadways. Stockpiled or containerized scrap material will be covered with plastic sheeting to prevent migration of particulates, as necessary. Trucks transporting scrap metal will be tarped and dry-decontaminated at the loading area to reduce fugitive dust and particulates. Speed limits on haul roads will also be enforced.

Burning

Hot-work permits are anticipated for this work during the cutting of the various tanks and equipment structures. All work requiring an open flame will be coordinated with the Caretaker Site Office (CSO), the Project Health and Safety Officer, and the Resident Officer in Charge of Construction ROICC), and the applicable fire departments for Alameda Point and/or the City of Alameda.

Noise Standards

Shaw personnel will comply with Occupational Safety and Health Administration and applicable state noise standards. Equipment operators, contractors, and other personnel will be required to wear appropriate hearing protection when necessary, as detailed in the SHSP (Appendix B).

Efforts will be made to locate operating equipment, such as air supply equipment and construction equipment, away from personnel working in the vicinity.

8.2.3 Protection of Surface and Groundwater Resources

Deconstruction activities associated with this project will be conducted in a manner that will prevent the discharge of pollutants and will minimize the impact to water resources and soil within and outside the project boundaries. Project activities will be conducted in compliance with all federal, state, and local ARARs regarding potential and actual contamination of surface, groundwater, and soil. These preventative measures are applicable to each facility and include spill prevention and response and storm water management that are applicable to each site.

Spill Prevention and Response Measures

The only materials anticipated to be handled during the project that could potentially be spilled or released are water accumulated within sumps and tanks, contents of waste conveyance piping (if present), decontamination water, or fuels and oils used in the equipment on-site. When handling and transferring the above materials, the following spill prevention measures will be undertaken:

- Equipment containing liquids, such as holding containers for decontamination water, will be placed within a secondary containment area.
- The decontamination water will be properly disposed of at the end of the removal action.
- Upon mobilization to the site and periodically during operations, all equipment will be inspected visually for leaks and drips.

Shaw will maintain an inventory of the following equipment and materials for use in the event of a hazardous material spill or release:

- Absorbent pads
- Granular absorbent material (noncombustible)
- Polyethylene sheeting
- 55-gallon drums
- Shovels and assorted hand tools

In the event of a release or spill of hazardous material that may impact air, soil, or water (on site or off site), Shaw personnel will immediately notify the CSO representative and the facility Fire Department or Hazardous Materials (HAZMAT) unit. An assessment will be made of the magnitude and potential impact of the release. If it is safe to do so, site personnel will attempt to locate the source of the release, prevent further release, and contain the spilled materials as follows:

- The spill area will be approached cautiously. The material and associated hazards will be identified based on available information from witnesses to determine the proper personal protection levels, methods, and equipment necessary for the response.
- The source of the spill will be controlled immediately.
- If fuel is spilled, Shaw personnel will impose a 50-foot-radius rule, and all sources of ignition will be eliminated.
- If possible, spill containment will be made, initially, without entering the immediate release area.
- Spill containment and collection will be performed by using absorbent materials and constructing temporary dikes.
- Collected material will be properly characterized and disposed of, if necessary.

Given the types and quantities of liquids handled during this project, it is not anticipated that site personnel will require outside help to manage any spill that may potentially occur. However, if Shaw personnel cannot safely and sufficiently respond to an environmental release, assistance from the facility or HAZMAT unit will be employed.

Storm Water Management

In accordance with this WP, disassembled waste tanks and waste conveyance piping will be secured on site prior to transportation to an approved off-site disposal facility or recycler. The scrap material stockpile area will be constructed with a layer of plastic sheeting placed on the ground surface. The stockpile area may be bermed to contain any storm water that may be encountered during this project. All storm drains will be covered to minimize any potential for runoff. Consequently, no runoff is expected from the scrap material and no other controls are necessary.

8.2.4 Protection of Land Resources

Construction activities associated with this project will be conducted in a manner that minimizes the impact to land resources within and outside the project boundaries. Project activities will be coordinated with the CSO and ROICC to minimize impact.

Natural Resources Protection

Shaw personnel will coordinate with the CSO and the ROICC prior to construction activities at the parcels to identify any land resources that require preservation within the work areas. Currently, there are no known sensitive habitats on Parcels 27 and 66, but parcel(s) adjacent to Parcel 27, for example Parcel 25, may warrant protection. If any are identified, Shaw personnel will mark the areas to be preserved and provide fencing, barriers, or other physical protection, as needed. Shaw personnel will make reasonable efforts to minimize damage of land resources within and outside the project work area.

Historical and Archeological Finds

There are no identified structure(s) and/or artifact(s) of historical importance within the work area. Items discovered during construction activities that could be of historical or archeological interest will be carefully preserved in an undisturbed state. The Site Superintendent will immediately report any findings to the CSO and the ROICC so that proper authorities may be notified.

8.3 Restoration and Cleanup

Restoration and cleanup will be performed to bring the areas affected by sampling activities back to match their surrounding conditions. This restoration will be performed by Shaw after the construction phase is completed and accepted by the CSO and the ROICC. Final site restoration and cleanup may include the following:

- Resurfacing all field work locations to original grade with like material
- Collecting and disposing of all contractor generated contaminated material, debris, disposable personal protective equipment, and rubbish
- Removing support area facilities
- Removing temporary fences and signs installed under this contract
- Mechanical broom sweeping of all work areas and haul routes, if necessary

With the completion of site restoration and cleanup, all field activities will be considered complete. Shaw personnel will notify the CSO and ROICC offices when noncompliances are issued and when the corrections to noncompliances are completed. Shaw personnel will maintain a Rework Items List. Shaw will leave the project site in a suitably restored condition.

9.0 References

Department of Toxic Substances Control, 1993, *Hazardous Waste Facility Permit*. Department of the California Environmental Protection Agency. United States Environmental Protection Agency Identification Number CA2170023236. Berkeley, California, June.

ERM-West, 1994, *Workplan for Conducting Parcel Specific Environmental Baseline Surveys, Naval Air Station Alameda. Contract Number N6247-92-D-3607* (Shell Work Plan). Volumes I and II. Walnut Creek, California. July.

ERM-West, 1995, *Parcel 27 Evaluation Plan. Environmental Baseline Survey, Naval Air Station Alameda,* Contract N627-92-D3607, March.

IT Corporation, 1996a, *RCRA Part B Permit Closure Subsurface Investigation Workplan Industrial Waste Treatment Plant #25, NAS Alameda.* Alameda, California. February.

IT Corporation, 1996b, *RCRA Part B Permit Closure Subsurface Investigation Workplan Industrial Waste Treatment Plant #32, NAS Alameda.* Alameda, California. May.

IT Corporation, 1998, *Environmental Baseline Survey, Data Evaluation Summaries, NAS Alameda.* Alameda, California. Volumes I through XIV. December.

IT Corporation, 2000a, *Draft, RCRA Part B Permit Closure, Subsurface Investigation Report Industrial Waste Treatment Plant #25, Alameda Point, Alameda, California, IT Corporation,* DO No. 44, February 2000

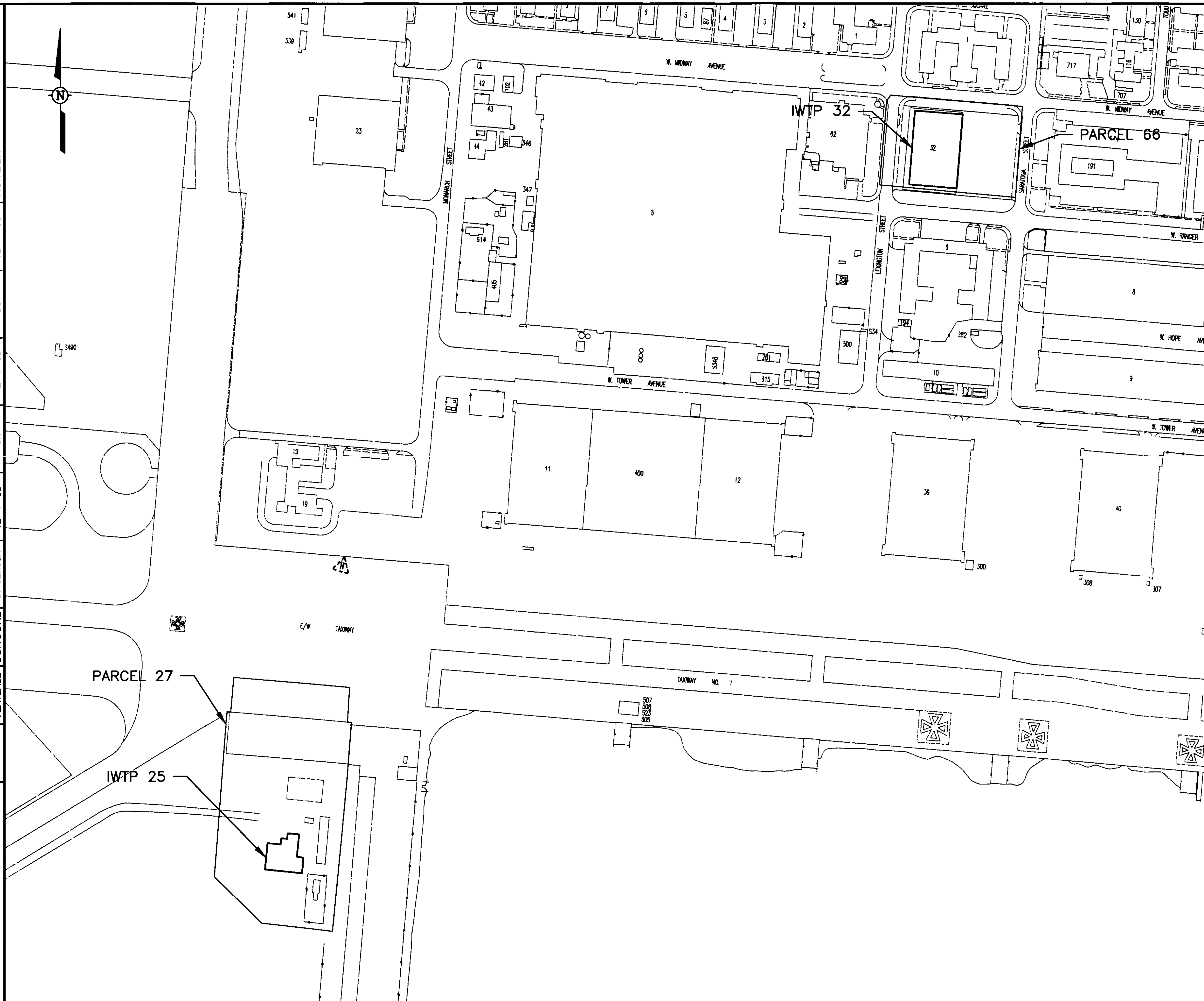
IT Corporation, 2000b, *Draft, RCRA Part B Permit Closure, Subsurface Investigation Report Industrial Waste Treatment Plant #32, Alameda Point, Alameda, California, IT Corporation,* DO No. 44, February 2000

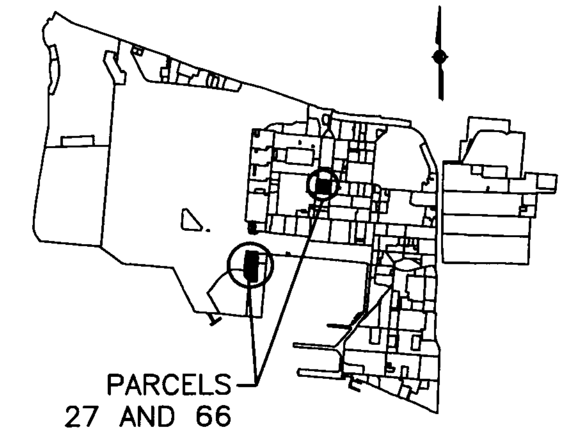
IT Corporation, 2000c, *IT Standard Quality Procedures and Standard Operating Procedures Manual*, August.

Tetra Tech EM, Inc., 2003a, *Amendment to the Closure Plan Industrial Waste Treatment Plant (IWTP) 25, Draft Final, August 19, 2003*

Tetra Tech EM, Inc, 2003b, *Amendment to the Closure Plan Industrial Waste Treatment Plant (IWTP) 32, Preliminary Draft, In Preparation*

Figures





SCALE
0 300 600 FEET

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	ALA1BASE	CONCORD	B. JENSEN 12-4-03	SK 12-4-03	DS 12-4-03	807181-B128

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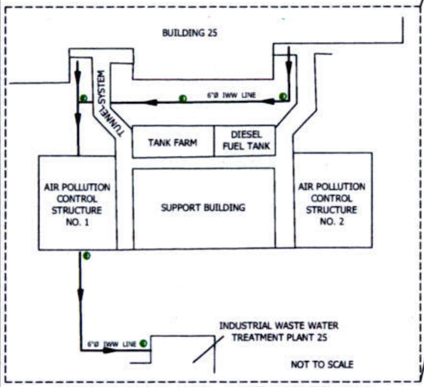
NAVAL FACILITIES ENGINEERING COMMAND
SOUTHWEST DIVISION
SAN DIEGO, CALIFORNIA

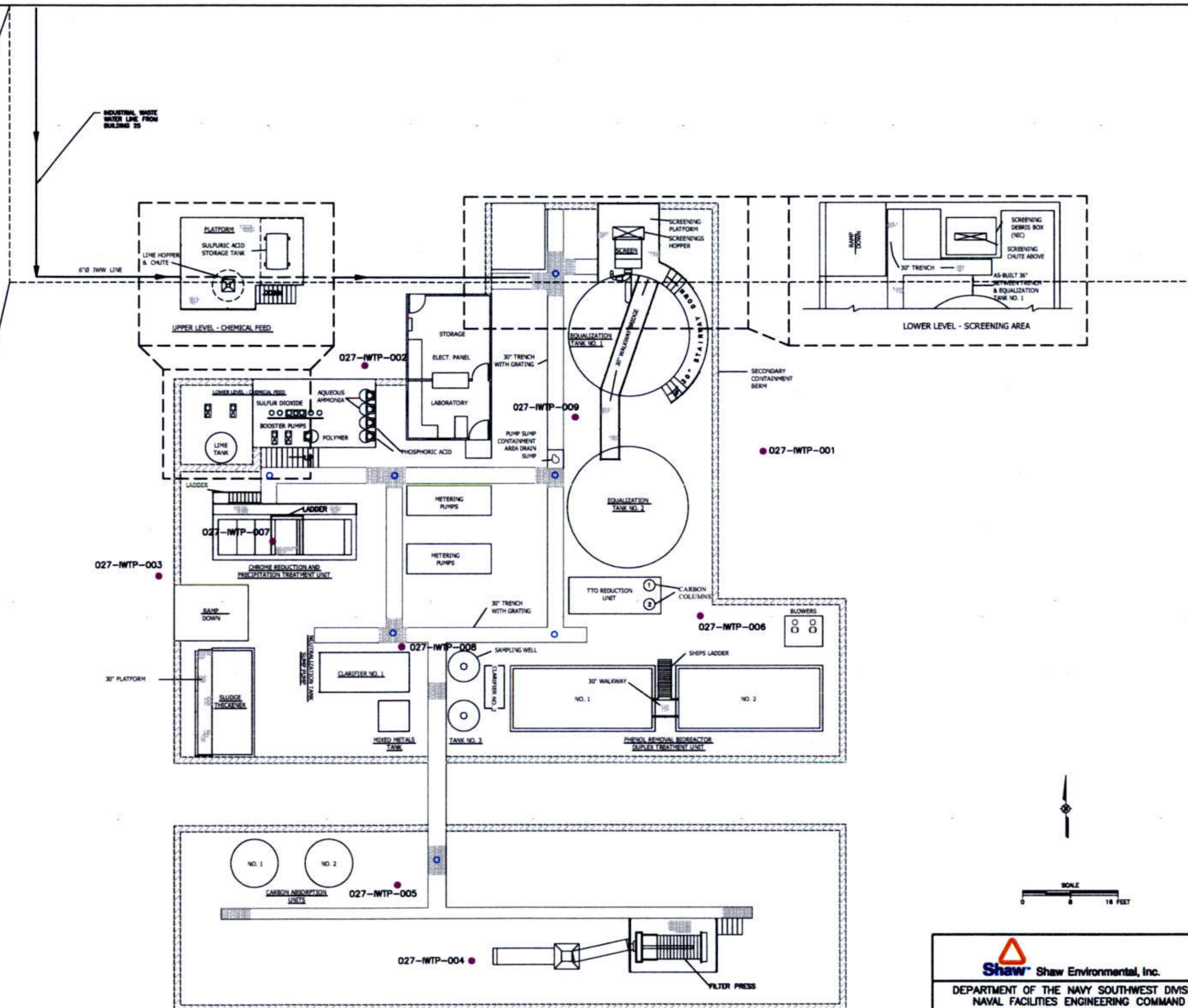
FIGURE 1

SITE LOCATION MAP
IWTPs 25 AND 32
ALAMEDA POINT
ALAMEDA, CALIFORNIA

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	CONCORD	SCHAEFFER 9/25/03	SK 12/1/03	DS 12/1/03	807181-D74



INSET SHOWING AREA NORTH OF DRAWING



LEGEND

- ● PREVIOUS SOIL SAMPLE LOCATION (SEE NOTE 1)
- ● PROPOSED PIPELINE SOIL SAMPLE LOCATION
- ○ PROPOSED TRENCH LOCATIONS FOR SOIL/GROUNDWATER/CONCRETE CHIP SAMPLES (SEE NOTE 2)
- TRENCH WITH GRATING
- SECONDARY CONTAINMENT BERM
- IWW LINE (APPROXIMATE LOCATION BASED ON CONSTRUCTION DRAWINGS)
- The dash line shows an inset of top of the figure on this page and part of the figure on another page.

NOTES:

1. PREVIOUS SOIL SAMPLE LOCATIONS COMPLETED DURING RCRA PART B CLOSURE PERMIT SAMPLING BY IT CORP. 1999. THESE LOCATIONS WILL BE RESAMPLED FOR SOIL VOCs USING THE ENCORE® METHOD.
2. LOCATIONS OF 6 BACKGROUND CONCRETE CHIP SAMPLES WILL BE SELECTED DURING FIELD MOBILIZATION IN THE PRESENCE OF DTSC STAFF WITH THEIR CONCURRENCE.

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FIGURE 2
SOIL, GROUNDWATER AND CONCRETE CHIP SAMPLE LOCATIONS
RCRA CORRECTIVE ACTIONS AT IWTP 25
ALAMEDA POINT
ALAMEDA, CALIFORNIA

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
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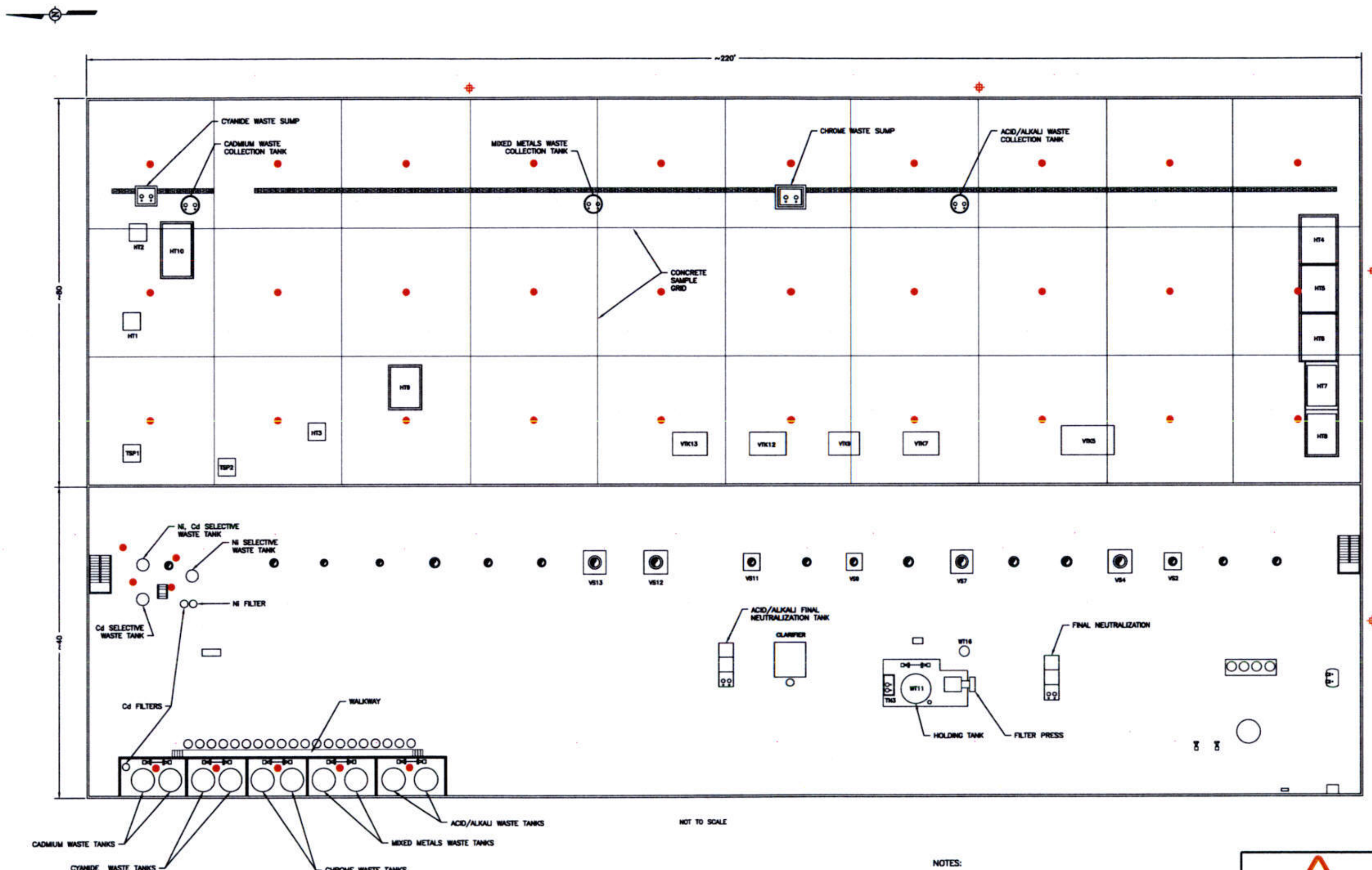

LEGEND

- TRENCH WITH GRATING
- SECONDARY CONTAINMENT BERM
- CONCRETE CHIP SAMPLE LOCATION (SEE NOTES 1 AND 2)
- PROPOSED SOIL SAMPLE LOCATION
- VENT STACK
- SCRUBBER

NOTES:

1. LOCATIONS OF CONCRETE CHIP SAMPLES MAY CHANGE WITHIN THE GRID BASED ON FLOOR STAINING AND LOCATION OF EQUIPMENT.
2. BACKGROUND CONCRETE CHIP SAMPLES WILL BE COLLECTED FROM A VISUALLY CLEAN AREA ON THE FIRST FLOOR OF IWTP 32. THESE WILL BE LOCATED IN THE PRESENCE OF DTSC STAFF WITH THEIR CONCURRENCE.
3. APPROXIMATE GROUND FLOOR ELEVATION IS 114.0 FT. AND BASEMENT ELEVATION IS 110.0 FT. DATUM USED IS ALAMEDA NAS DATUM BM 54, EL. 116.98 FT. LOCATED AT CENTER LINE WEST END OF BUILDING 9.
4. APPROXIMATE DIRECTION OF GROUNDWATER FLOW BENEATH BUILDING 32 IS NORTH NORTHWEST.

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FIGURE 3

SOIL AND CONCRETE CHIP SAMPLE LOCATIONS
RCRA CORRECTIVE ACTIONS AT IWTP 32
ALAMEDA POINT
ALAMEDA, CALIFORNIA

Tables

Table 1
RCRA Part B Permitted and Non-Permitted Units at IWTP 25

PERMITTED UNITS		
Unit	**Approx. Volume (gal)**	**Construction**
Chrome Reduction Tank (Flocculation Chamber)	6900 for the whole unit	Carbon Steel
Chrome Reduction Tank (pH Adjustment Chamber)		
Chrome Reduction Tank (O/W Separator Chamber)		
Chrome Reduction Tank (Chrome Reduction Chamber)		
Chrome Reduction Tank (Lower Chamber)		
Neutralization Units	790 for tank and sump	Mild Steel
Bioreactor No. 1	12,540	Fiberglass
Bioreactor No. 2	12,540	Fiberglass
Clarifier No. 1	3,000	Carbon Steel
Clarifier No. 2	500	Carbon Steel
Sampling Well	400	Carbon Steel
Blue Tank No. 1 (TTO Reduction Unit)	500	
Blue Tank No. 2 (TTO Reduction Unit)	500	
Equalization Tank No. 1	32,000	Carbon Steel
Equalization Tank No. 2	41,000	Carbon Steel
Sludge Thickener Tank	6,000	Mild Steel
Paint Screen w/ Hopper	380	Steel
Calgon Carbon Unit	2,750	Carbon Steel
Calgon Carbon Unit	2,750	Carbon Steel
Filter Press	NA	Steel
NON-PERMITTED UNITS		
Unit	**Approx. Volume (gal)**	**Construction**
Mixed Metals Tank	NA	Carbon Steel
Tank No. 3	750	Fiberglass

Table 2
RCRA Part B Permitted and Non-Permitted Units at IWTP 32

PERMITTED UNITS			
Unit No.	Function	Capacity (gal.)	Construction
Main Floor			
CD-30	Cd filter	14	Stainless Steel
CD-31	Ni filter	14	Stainless Steel
FCD-1	Cd filter	14	Stainless Steel
TSP-3	Ni waste tank	800	Steel
TSP-4	Cd waste tank	800	Steel
TSP-5	Ni & Cd waste tank	800	Steel
WT-1	Cyanide waste tank	4,000	Fiberglass
WT-2	Cyanide waste tank	4,000	Fiberglass
WT-3	Cadmium waste tank	4,000	Fiberglass
WT-4	Cadmium waste tank	4,000	Fiberglass
WT-5	Mixed Metals tank	6,000	Fiberglass
WT-6	Mixed Metals tank	6,000	Fiberglass
WT-7	Chrome waste tank	4,000	Fiberglass
WT-8	Chrome waste tank	4,000	Fiberglass
WT-9	Acid/Alkali tank	6,000	Fiberglass
WT-10	Acid/Alkali tank	6,000	Fiberglass
WT-11	Holding tank (final neutralization)	7,500	Fiberglass
TN-1	Acid/Alkali final neutralizing tank	3,000	Stainless Steel
TN-2	Neutralizing tank (final neutralization)	1,500	Stainless Steel
CLAR	Clarifier	NA	Steel
NA	Filter Press	NA	Steel
Basement			
SUMP-2	Cadmium waste collection tank	800	Stainless Steel
SUMP-4	Mixed Metals collection tank	800	Carbon Steel
SUMP-5	Acid/Alkali waste collection tank	800	Carbon Steel
NA	Chrome waste sump (in-ground)	800	Concrete
NA	Cyanide waste sump (in-ground)	900	Concrete

Table 2 (Continued)
RCRA Part B Permitted and Non-Permitted Units at IWTP 32

NON-PERMITTED UNITS			
Unit No.	Function	Capacity (gal.)	Construction
Main Floor			
WT-16	Industrial Waste Tank	215	Al or SS
TN-3	Neutralization Tank	840	Stainless Steel
Basement			
TSP-1	Cadmium Waste Tank	300	Carbon Steel
TSP-2	Nickel Waste Tank	300	Carbon Steel
HT-1	Spent Cyanide Plating Solution	300	Stainless Steel
HT-2	Spent Cyanide Plating Solution	300	Stainless Steel
HT-3	Spent Cadmium Plating Solution	300	Stainless Steel
HT-4	Spent Acid/Alkali & Mixed Metals Plating Solution	1,700	Stainless Steel
HT-5	Spent Cadmium, Chromium, and Mixed Metals Plating Solution	1,700	Stainless Steel
HT-6	Spent Chromium & Acid/Alkali Plating Solution	1,700	Stainless Steel
HT-7	Spent Acid/Alkali & Mixed Metals Plating Solution	1,100	Poly
HT-8	Spent Chromium & Acid/Alkali Plating Solution	1,100	Poly
HT-9	Spent Acid/Alkali & Mixed Metals Plating Solution	1,100	Poly
HT-10	Spent Cyanide Plating Solution	1,400	Stainless Steel
VTK-5	Mixed Metals Waste Tank	1,400	PVC
VTK-7	Chrome Waste Tank	725	Carbon Steel w/ poly coating
VTK-9	Acid/Alkaline Waste Tank	725	Carbon Steel w/ poly coating
VTK-12	Chrome Waste Tank	725	Carbon Steel w/ poly coating
VTK-13	Chrome Waste Tank	725	Carbon Steel w/ poly coating

Note: Highlighted units are those that will be closed in place.

Appendix A
Sampling and Analysis Plan
(Field Sampling Plan/Quality Assurance Project Plan)

FINAL

SAMPLING AND ANALYSIS PLAN (FIELD SAMPLING PLAN/QUALITY ASSURANCE PROJECT PLAN)

RCRA Corrective Action at IWTPs 25 and 32
Alameda Point
Alameda, California

Environmental Remedial Action
Contract Number N62474-98-D-2076
Contract Task Order 0013

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FINAL

SAMPLING AND ANALYSIS PLAN (FIELD SAMPLING PLAN/QUALITY ASSURANCE PROJECT PLAN)

RCRA Corrective Action at IWTPs 25 and 32
Alameda Point
Alameda, California

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Acronyms and Abbreviations

bgs	below ground surface
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chain-of-custody
CTO	Contract Task Order
DOT	U.S. Department of Transportation
DQO	data quality objective
DTSC	Department of Toxic Substances Control
EBS	Environmental Baseline Survey
EDD	electronic data deliverable
EBMUD	East Bay Municipal Utility District
EPA	U.S. Environmental Protection Agency
GC	gas chromatography
GC/MS	gas chromatograph/mass spectrometer
HEM	Hexane Extraction Method
IDW	investigation-derived waste
IT	IT Corporation
IWTP	Industrial Waste Treatment Plant
LCD	laboratory control duplicate
LCS	laboratory control sample
MCL	Maximum Containment Level
MDL	Method Detection Limit
MS	matrix spike
MSA	Method of Standard Addition
MSD	matrix spike duplicate
NADEP	Naval Aviation Depot
NARF	Naval Aircraft Refit Facility
NAS	Naval Air Station
NFESC	Naval Facilities Engineering Services Center
O&G	oil and grease
POTW	publicly-owned treatment works
PQL	practical quantitation limit
PRG	Preliminary Remedial Goal
PWC	Public Works Commission
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RAC	Remedial Action Contract
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SDG	sample delivery group
SOP	Standard Operating Procedure

Acronyms and Abbreviations (continued)

SVOC	semivolatile organic compound
SWDiv	U.S. Navy Southwest Division
T&D	transportation and disposal
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons
TtEMI	Tetra Tech EM, Inc.
VOA	volatile organic analysis
VOC	volatile organic compound

1.0 Introduction

Shaw Environmental, Inc. has prepared this Sampling and Analysis Plan (SAP) in support of the Resource Conservation and Recovery Act (RCRA) removal actions at Industrial Waste Treatment Plants (IWTPs) 25 and 32 located at Alameda Point, Alameda, California. This SAP is a combination of a Field Sampling Plan and a Quality Assurance Project Plan (QAPP). It provides complete guidance for all field sampling and analysis activities to be performed for the project.

Waste tanks and waste conveyance piping at IWTPs 25 and 32 will be dismantled and removed from the site. Soil, groundwater, and concrete will be sampled to determine if chemical releases occurred during plant operation. This SAP will address the sampling and analysis necessary to achieve RCRA closure of both facilities.

This work will be conducted under Contract Task Order (CTO) 0013 of Naval Facilities Engineering Command, Engineering Field Division Southwest under Environmental Remedial Action Contract (RAC) Number N62474-98-D-2076.

This SAP is based on the requirements of the following documents:

- *Navy Installation Restoration Chemical Data Quality Manual* (Naval Facilities Engineering Services Center [NFESC], 1999)
- *Data Quality Objectives Process for Hazardous Waste Site Investigations, EPA QA/G-4HW* (U.S. Environmental Protection Agency [EPA], 2000)
- *Requirements for Quality Assurance Projects Plans, EPA QA/R5* (EPA, 2001)
- *Environmental Work Instruction 3EN2.1—Chemical Data Validation* (U.S. Department of the Navy Southwest Division [SWDiv], 2001a)
- *Environmental Work Instruction 3EN2.2—Review, Approval, Revision, and Amendment of Field Sampling Plans and Quality Assurance Project Plans* (SWDiv, 2001b)
- *Environmental Work Instruction 3EN2.3—Laboratory Quality Assurance Program* (SWDiv, 2001c)
- Quality Control Program Plan for Environmental Remedial Actions, Contract Number N62474-98-D-2076 (IT Corporation [IT], 2000a)

The QAPP elements are categorized into four groups that have been addressed in this SAP as follows:

- **Group A: Project Management**
  - Title and approval sheet
  - Table of contents
  - Project/task organization – Section 1.5
  - Data quality objectives (DQOs) – Section 2.0
  - Documentation and records -- Sections 5.3, 5.4, 9.0, and 10.3
- **Group B: Measurement/Data Acquisition**
  - Sampling method requirements – Section 4.2
  - Sample handling and custody requirements – Sections 4.4, 5.1, and 5.2
  - Analytical method requirements – Section 3.7
  - Quality control (QC) requirements – Sections 3.8 and 6.0
  - Instrument/equipment testing, inspection, and maintenance requirements – Section 7.4
  - Instrument calibration and frequency – Section 7.3
  - Acceptance requirements for supplies and consumables – Sections 4.1 and 7.6
- **Group C: Assessment/Oversight**
  - Assessments and response actions – Section 10.1
  - Reports to management – Section 10.2
- **Group D: Data Validation and Usability**
  - Data review, validation, and verification requirements – Section 9.3
  - Validation and verification methods – Section 9.2
  - Reconciliation with user requirements – Section 9.3

1.1 Site History and Background

The former Naval Air Station (NAS) Alameda, now renamed Alameda Point, is located on the western end of Alameda Island, south of Oakland, primarily in Alameda County, California. Alameda Island is separated from Oakland by the Oakland Inner Harbor, which was constructed during the late 1800s and early 1900s. Prior to this time, Alameda consisted of a peninsula surrounded by marsh and tidal areas. After construction of the Inner Harbor, fill was laid over the marsh, tidal areas, and open waters. Alameda Point is constructed on this fill material. The exact source of much of the fill material is undocumented, although dredge spoils from the nearby waterways were likely used for much of the fill material.

Numerous industries were present in the marsh and tidal areas of the Alameda Peninsula, prior to and during various stages of filling, in the mid- to late-1800s. Many of these industries were related to petroleum/coal storage and refining, natural gas manufacturing, and ship manufacturing. Chemicals detected at the subject facilities include metals, petroleum hydrocarbons, aromatic hydrocarbons, and polynuclear aromatic hydrocarbons.

1.2 Industrial Waste Treatment Plant No. 25

Industrial Waste Treatment Plant 25 is located on Parcel 27 in the southern central section of Alameda Point (Zone 7, Corrosion Control and Aircraft Testing Zone), as shown on Figure 1, "Site Location Map, IWTPs 25 and 32." The Environmental Baseline Survey (EBS), performed by IT, and Phase I site inspection and information provided by Naval Aviation Depot (NADEP) indicated that there are currently seven buildings (Buildings 25, 25A, 451, 494, 595, 622, and 623) on Parcel 27 (ERM-West, 1995). The majority of these facilities supported aircraft paint and coating removal activities. Stripping and corrosion control operations occurred in Building 25, (NADEP Corrosion Control Facility), formerly known as the Naval Aircraft Refit Facility (NARF) Corrosion Control. Building 25A (IWTP 25) provided waste treatment for paint and coating waste streams from Building 25. Operations within Building 25 were terminated before base closure in 1997. Operations continued at Building 25A (IWTP 25) until 1999, treating fluid waste from base closure and cleanup activities. The IWTP ceased operations before July 1999.

Constructed in 1987, Building 25 is a 54,500-square-foot steel warehouse-style structure. The floor of Building 25, (NADEP Corrosion Control Facility) contains six concrete work bays. Each work bay was used to perform one of three corrosion prevention processes including plastic media grit stripping, chemical stripping, and washing. A trench system collected rinsate from the work bays and transported it to Building 25A (IWTP 25) located south of Building 25. The rinsate from the processes at Building 25 reportedly contained halogenated and non-halogenated organics, metals, petroleum products, and corrosives.

Building 25A (IWTP 25) was built in the late 1980s. This building housed the wastewater treatment facility and laboratory, which processed effluent from Building 25. Wastewater from corrosion control operations at Building 25 contained paint skins, phenol, oil and grease (O&G), other organics, and metals. Chemicals used or generated in Building 25A during wastewater treatment included paint sludge, wastewater containing paint stripper and anticorrosive, treatment sludge, sulfuric acid, phosphoric acid, and small quantities of phenol, ammonia, phosphate, mercury waste, chromium, and spent methylene chloride waste. The wastewater was processed through IWTP 25 wherein paint chips were filtered out; phenol was biologically reduced; and organics were absorbed in carbon or destroyed. Oil and grease were separated, and chromium was reduced and precipitated. The precipitated sludge was dewatered and disposed of off site. The wastewater was discharged under permit via the Station's industrial sewer system to the East Bay Municipal Utility District's (EBMUD's) wastewater treatment plant.

1.2.1 Process Description

Information collected during the EBS site inspection indicates that IWTP 25 had the capacity to treat approximately 5,000 gallons of rinsate water per day. According to the facility hazardous waste permit, the components of IWTP 25 included a paint screen and hopper; two equalization tanks, chrome treatment units, two clarifiers, neutralization units, two bioreactor units, a sludge thickener, two carbon units, total toxic organic reduction units, a sampling well, and a filter press. After the paint sludge was removed, it accumulated on site, pending off-site disposal. The wastewater, consisting of paint stripper and anticorrosive, was pumped into an initial holding tank, and then through a series of treatment tanks. Treated wastewater was discharged to the industrial waste sewer. The resultant solid, a pressed metal/bacteria sludge, accumulated on site and was later disposed of at licensed disposal facilities. Industrial Waste Treatment Plant 25 had a system of shallow concrete trenches equipped with pumps, in which process overflow liquid collected and circulated back into the main tank.

Potential compounds of concern were determined through a visit to IWTP 25 with a Public Works Commission (PWC) operator, review of the processes at the facility, review of previous investigations, and reported incident releases. Potential compounds of concern at IWTP 25 include phosphoric acid, sulfuric acid, methylene chloride, phenols, halogenated and non-halogenated organics, metals (chromium, mercury, and lead in particular), and corrosives.

1.3 Industrial Waste Treatment Plant No. 32

Industrial Waste Treatment Plant 32 (IWTP 32) is located in Parcel 66, in the central section of Alameda Point (Zone 13, Central Light Industrial Zone) shown on Figure 1. Industrial Waste Treatment Plant 32 is located in Building 32, occupying the western half of the building. Building 32 is a 34,500 square foot structure specifically designed to house plating shop operations and waste processing operations. Containment barriers in the structure were designed to prevent uncontrolled releases of chemicals to the environment.

Building 32 was constructed in 1990 for plating and metal finishing operations. Other activities that occurred inside Building 32 included electric drying in ovens, welding, ion vapor deposition, chrome anodizing and plating, degreasing, abrasive blasting, chromium/magnesium/aluminum finishing, cadmium conversion coating, and acid etching and stripping. These processes typically involved the use or generation of chemicals and waste including mixed metals, cyanide waste, cadmium waste, chromium, acids, alkalis, chrome waste, and nickel precipitates. According to the *Parcel 66 Parcel Evaluation Plan* (ERM-West, 1995), metal degreasers, including volatile organic compounds (VOCs), sodium salts, reactives, corrosives, and lubricants, have been stored in Building 32 since its construction. Disposal of waste process chemicals was accomplished by treatment at IWTP 32 followed by discharge into the sanitary sewer.

1.4 Scope and Objectives

The scope of work for this project consists of the following tasks:

- Demolition and removal of RCRA permitted and non-permitted tanks and associated waste conveyance piping at IWTP 25
- Demolition and removal of RCRA permitted and non-permitted tanks and associated waste conveyance piping at IWTP 32
- Investigative soil and groundwater sampling beneath IWTP 25
- Investigative soil sampling along the southern and eastern perimeter of Building 32
- Concrete chip sampling for flooring of IWTP 25 and 32
- Wipe and rinsate samples, if necessary, from tanks and associated piping at IWTPs 25 and 32
- Investigation derived waste sampling and disposal

This SAP has the following objectives:

- Provide a rationale for field sampling activities.
- Describe the sampling strategy and design.
- Describe and establish consistent field sampling procedures.
- Establish data gathering, sample handling, and documentation methods that will be employed during field activities.

Soil, water, concrete chip, and wipe samples (if necessary) will be collected and analyzed to achieve the project objectives. Analytical data collected under the provisions of this SAP will be used to characterize any contamination, if present, found beneath IWTP 25 and to cost-effectively dispose of or recycle demolition materials.

1.5 Project Organization

The project organization consists of representatives from the U.S. Department of the Navy providing technical direction and quality assurance (QA) oversight, and the Shaw Environmental, Inc. Team. The project organization consists of the following members:

- U.S. Navy Remedial Project Manager, Southwest Division
- U.S. Navy QA Officer
- Program Manager
- Installation Coordinator
- Project Manager
- Program QC Manager
- Program Chemist
- Program Health and Safety Manager
- Site Health and Safety Officer
- Technical Manager
- Construction Manager
- Project QC Manager
- Project Chemist
- Project Business Administrator
- Site Superintendent
- Transportation and Disposal (T&D) Coordinator

The Shaw Team is shown in Figure 4, "QC Organization Chart, IWTPs 25 & 32, CTO 0013."

The responsibilities of the team members associated with data acquisition activities are presented in Table 1, "Project Personnel and Chemical Data Collection Responsibilities."

2.0 Data Quality Objectives

The DQO process is a series of planning steps based on scientific methods that are designed to ensure that the type, quantity, and quality of environmental data used for decision making are appropriate for the intended application. The DQO process, as defined by the EPA, consists of seven steps that are designed to provide a systematic approach to resolving issues that pertain to the site investigation and remediation (EPA, 2000). This section describes the outcome of the seven-step DQO process for data collection activities under this task.

2.1 Stating the Problem

Step 1: Identify the planning team members, including decision makers, describe the problem, develop a conceptual model of the environmental hazard to be investigated, and determine resources such as budget, personnel, and schedule.

The planning team consists of representatives from the Navy and Shaw – the prime contractor for the Navy RAC, with regulatory support and oversight from Department of Toxic Substances Control (DTSC) and the Regional Water Quality Control Board. The Navy is the lead federal agency for the direction of site activities and the prime decision maker. The work will be conducted according to the Navy-approved budget and schedule.

During operation, IWTPs 25 and 32 used chemicals and physical processes to treat wastewater. The vessels, piping, process chambers, and other equipment at the IWTPs have been emptied and cleaned by another contractor in 1999. Under this CTO the Navy has contracted with Shaw to demolish and dispose of process equipment, tanks and piping at both IWTPs 25 and 32 under a RCRA closure permit.

In addition to the demolition, Shaw will sample soil and groundwater from IWTP 25, soil from the southern and eastern perimeter of Building 32 and concrete from both IWTPs 25 and 32 to determine if water treatment activities have impacted the sites.

2.2 Identifying the Decisions

Step 2: Identify the principal study question; define alternative decisions; develop a decision statement; and organize multiple decisions.

The principal study question is; have operational activities at IWTPs 25 and 32 impacted soil and groundwater and do the facilities meet the requirements for RCRA closure?

The decisions requiring environmental data acquisition will answer the following questions:

- Are chemicals of concern detected above screening criteria in soil and groundwater at IWTPs 25 and 32?
- Are concentrations of chemicals of concern in concrete chip samples from process areas significantly different than concentrations found in background concrete chip samples?
- Does the demolition debris meet the criteria for recycling or other cost-effective disposal?
- What are the disposal options for waste?

Soil and groundwater sampling and analysis will be conducted to determine whether a release that poses a potential threat to human health or the environment has occurred at IWTP 25 and 32. The data will be used to determine if the site requires further action or to recommend site closure.

2.3 Identifying Inputs to the Decisions

Step 3: Identify the information needed: determine sources for this information; determine the basis for determining the action level; and identify sampling and analysis methods that can meet the data requirements.

Knowledge about tank contents, process treatment, and waste receiving and recycling facilities requirements were the sources of information used to determine the sampling and analyses necessary to meet demolition and disposal project objectives. If necessary for disposal, analytical data will be obtained from cleaned equipment. Regulatory input identified the need for soil, groundwater, and concrete chip sampling to achieve site closure at both IWTP sites.

2.3.1 Cleanup Goals

The EPA Region 9, Preliminary Remedial Goals (PRGs) for Industrial soil and the EPA Region 9 and California Department of Health Services Maximum Contaminant Level (MCL) for Drinking Water (EPA, 2002) are defined as the cleanup goals (closure performance criteria) in the Amendments to the Closure Plan for IWTPs 25 and 32. The analytical suite selected for soil and groundwater analysis is based on previous data collected from the site described in the *Summary Report RCRA Part B Permit Subsurface Closure, IWTP #25* (IT, 2002) regulatory input, and process treatment knowledge. The analytical results obtained from soil samples will be compared to the screening criteria shown in Tables 2, "Comparison Criteria for Soil and Groundwater," and 3, "Background Concentration in Shallow Groundwater and Soil, Alameda Point." The PRGs will be used as an initial screening tool for soil organics and background levels will be used for inorganics, however, when all data is available, a quantitative risk assessment will be completed to make risk management decisions for closure. Individual screen results will not be relied upon for risk decisions and all data will be included. The analytical results from groundwater samples will be compared to MCLs and background concentrations shown in Tables 2 and 3.

Since IWTP 32 is located within the boundary of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Site 5, the analytical results for VOCs in soil will need to be compared to levels of VOC contamination that are known to be present at CERCLA Site 5. This comparison will provide additional information for determining the likelihood that IWTP 32 is a source of VOC contaminants in the groundwater.

Concrete chips samples will be collected from the flooring of IWTPs 32 and 25 to determine if site activities have impacted concrete that will be left in place. Since concrete itself can contain a variety of materials, especially metals, the analytical results from concrete chips will be compared to a "background" concrete sample collected from each IWTP. The background concrete samples will be collected from an area of concrete that is not visually stained and outside of the outside containment berms.

The results from waste material will be compared to the requirements for defining hazardous waste described in the California Code of Regulations (CCR) Title 22 (Title 22 CCR), Code of Federal Regulations Title 40, and the disposal facility acceptance requirements. Analytical data collected from waste materials will be provided to the Shaw T&D coordinator to determine cost-effective disposal options.

2.4 Defining the Boundaries

Step 4: Define target population of interest; specify the spatial boundaries that clarify what the data must represent; determine the time frame for collecting data and making decisions; determine the practical constraints on collecting data.

There are multiple tanks and process equipment located at each IWTP that will be removed. The facility layouts are shown in Figures 2 and 3, and descriptions of what equipment will be removed at each site is provided in Table 4, "IWTPs 25 and 32 Tank Description and Analytical Waste Sampling Requirements."

Shallow soil and groundwater (up to 5 feet below ground surface [bgs]) beneath IWTP 25 and along the pipeline that runs from Building 25 through the boiler room then into IWTP 25 will be sampled to investigate possible contamination due to release.

Shallow soil along the southern and eastern perimeter of Building 32 will be sampled to investigate possible contamination due to release.

2.5 Developing a Decision Rule

Step 5: Specify an appropriate population parameter (mean, median, percentile); confirm that the action level exceeds measurement detection limits; and develop a decision rule (if...then statements).

Decisions related to the selection of the disposal options for the investigation-derived waste (IDW) will be made upon review of the chemical analyses and by comparing them to the disposal facility acceptance requirements.

Since the tanks were cleaned in 1999, no additional cleaning or sampling is anticipated to dispose of the tanks. However, if determined to be necessary, for cost-effective recycling or disposal, samples may be collected. Decisions related to the investigation of soil and groundwater from beneath the facilities will be made based on review of the chemical analyses and by comparing them to the criteria specified in Section 2.3.1.

The following decisions may be made based on the results of the soil sampling and analysis:

- If chemicals of concern are detected above the criteria specified in Section 2.3.1 in soil or groundwater beneath IWTP 25, then this data will used to evaluate options for remedial actions or used for risk management decisions.
- If chemicals of concern are not detected above criteria specified in Section 2.3.1 in soil or groundwater at IWTP 25, then the IWTP will be proposed for closure.
- If chemicals of concern are detected above the criteria specified in Section 2.3.1 in soil along the perimeter of Building 32, then this data will used to evaluate options for remedial actions or used for risk management decisions.
- If chemicals of concern are not detected above criteria specified in Section 2.3.1 in soil at Building 32, then the IWTP will be proposed for closure.
- If concrete chips from sumps or under process equipment contain chemicals of concern at statistically significant concentrations above the background concrete chip samples, then the Navy will evaluate options for remedial actions or used for risk management decisions.
- If concrete chips from sumps or under process equipment contain no chemicals of concern at statistically significant concentrations above the background concrete chip samples, then IWTPs 25 and 32 will be proposed for closure.
- If steel tank, fiberglass tanks and piping are visually inspected and do not contain any chemical residues, unknown liquids or extraneous material, then no samples will be collected for disposal or recycling.
- If steel tanks, fiberglass tanks and piping are visually inspected and are determined to contain chemical residues, unknown liquids or extraneous material, then the tanks will

be cleaned and wipe or rinsate samples will be collected (if necessary) for disposal or recycling.

- If paint chips from tanks or piping are determined to contain lead, then proper lead abatement and disposal will occur.
- If paint chips from tanks or piping are not lead based, then normal disposal actions will be taken.
- If water waste or debris are considered hazardous by law, then the waste will be transported for disposal at a state-approved hazardous waste disposal facility.
- If water waste or debris are considered nonhazardous by law, then the waste will be disposed of at a state-approved nonhazardous waste disposal/publicly-owned treatment works (POTW)/recycling facility.

2.6 Specifying Limits on Decision Error

Step 6: Determine the range of the parameter of interest; choose the null hypothesis; examine consequences of making an incorrect decision; specify a range of values where the consequences are minor (gray region); and assign probability values to points above and below the action level that reflect tolerable probability for potential decision errors.

This step does not apply because sampling is not based on probabilistic designs. The number and type of samples to be collected is based on knowledge of facility operations and negotiations between Shaw, the Navy, and DTSC to achieve RCRA Closure. The Wilcoxon rank sum test will be used to determine if metals concentrations in the concrete pads of process areas are statistically significant when compared to background concrete metals concentrations. To limit uncertainty in obtained environmental data, criteria for the precision, accuracy, representativeness, completeness, and comparability parameters and reporting limits for the contaminants of concern have been developed. The data that meet these criteria will be of definitive quality and of less uncertainty than the estimated data that do not meet the criteria.

2.7 Optimizing the Design for Obtaining Data

Step 7: Review the DQO outputs; develop data collection design alternatives; formulate mathematical expressions for each design; select sample size that satisfies the DQOs; decide on the most resource-effective design or agreed alternative; and document details in the SAP.

Based on previous information, both IWTPs are assumed clean and will be dismantled and disposed of with little sampling needed. However if the need arises, sampling will be conducted to facilitate cost-effective disposal. Soil and groundwater samples will be collected from beneath IWTP 25, and soil samples will be collected from the southern and eastern perimeter of Building 32. The sampling design is presented in the following section.

3.0 Sampling and Analysis Strategy

This section discusses the sampling and analysis strategy for soil, groundwater, concrete, and waste samples required to meet the project DQOs.

Procedures for sample collection and handling are discussed in Section 4.0, "Field Methods and Sampling Procedures," of this SAP. The Standard Operating Procedures (SOP) referenced in these sections are part of the *IT Standard Quality Procedures and Standard Operating Procedures Manual* (IT, 2000b).

Table 5, "Summary of Field Sampling and Analysis," presents a summary of sampling and analysis for the project activities.

3.1 Soil Sampling – IWTP 25

Investigative soil boring sampling will be conducted at IWTP 25 to determine if plant operations have impacted subsurface soil. Soil samples will be collected from the following locations:

- Nine locations previously sampled during the RCRA Part B Permit Closure activities conducted by IT in 1999 (shown on Figure 2, "Soil, Groundwater, and Concrete Chip Sample Locations, RCRA Corrective Actions at IWTP 25")
- Seven location along the shallow concrete trenches located inside IWTP 25 (shown on Figure 2
- Five locations along the pipeline that runs between the boiler room (outside of Building 25) and IWTP 25 (shown on Figure 2)

Based on regulatory comments to the *RCRA Part B Permit Closure Subsurface Investigation Report for Industrial Waste Treatment Plant # 25* (IT, 2000c) soil samples for VOC analysis by EPA Method 8260B must be re-collected using EPA Method 5035 (*Closed-System Purge and Trap and Extraction for Volatile Organics in Soil and Waste Samples*). New soil borings will be placed adjacent to locations sampled by IT in 1999, which are listed below and shown on Figure 2.

Previous Location Number	Sample Depth (feet bgs)
027-IWTP-0001	4.0 – 6.0
027-IWTP-0002	4.0 – 6.0
027-IWTP-0003	4.0 – 6.0
027-IWTP-0004	4.0 – 6.0
027-IWTP-0005	1.5 – 2.0
	4.5 – 6.0
027-IWTP-0006	1.0 – 1.5
	4.0 – 4.5
027-IWTP-0007	1.5 – 3.5
	4.0 – 6.0
027-IWTP-0008	4.0 – 6.0
027-IWTP-0009	4.0 – 6.0

Soil samples will be collected using EnCore™ sampling device following IT SOP 3.5 at the approximate depth intervals show above.

Soil samples from the shallow concrete trenches will be collected using direct-push drilling techniques or hand augers; groundwater samples (described in Section 3.2) will also be collected from the same boring locations. Two soil samples will be collected from each boring location, at approximately 0.5 to 1 foot bgs and 4 to 4.5 feet bgs. Soil samples from along the pipeline will be collected adjacent to the pipeline, but the exact sampling depths will not been determined until the pipeline is located through an underground utility search. Two soil samples will be collected from approximately 1 foot and 3 feet from the bottom of the pipeline. Three feet below the pipeline may be into the groundwater; if this occurs, then a soil sample will be collected at the soil/groundwater interface. Groundwater samples (described in Section 3.2) will also be collected from the same locations (adjacent to the pipeline) using direct-push drilling techniques. All soil samples collected from the concrete trench and pipeline locations will be analyzed for the following parameters:

- Volatile organic compounds by EPA Methods 5035/8260B

- Metals by EPA Method 6010B (arsenic, cadmium, chromium, copper, iron, lead, nickel, silver and zinc)
- Mercury by EPA Method 7471A
- Hexavalent chromium by EPA Method 7196A

3.2 Soil Sampling – IWTP 32

Investigative soil boring sampling will be conducted at Building 32 to determine if plant operations have impacted subsurface soil. Four boring locations will be placed on the southern and eastern sides of the building at the locations shown in Figure 3, "Soil and Concrete Chip Sample Locations, RCRA Corrective Actions at IWTP 32." Soil samples will be collected using either direct-push drilling techniques or hand augers. Up to three soil samples will be collected from each boring location, at approximately 0 to 0.5-foot bgs, 4 to 4.5 feet bgs, and at the groundwater interface. The number of samples and sample depths may change depending on the depth to groundwater identified at each boring location.

All soil samples will be analyzed for the following parameters:

- Volatile organic compounds by EPA Methods 5035/8260B
- Metals by EPA Method 6010B (arsenic, cadmium, chromium, copper, iron, lead, nickel, silver and zinc)
- Mercury by EPA Method 7471A
- Cyanide by EPA Method 9010/9012
- Hexavalent chromium by EPA Method 7196A

3.3 Groundwater Sampling

Groundwater samples will be collected from IWTP 25 to determine if plant operations have impacted shallow groundwater. Groundwater depth is approximately 5 to 8 feet bgs at IWTP 25. Groundwater samples will be collected using either direct-push drilling techniques (Hydropunch® or equivalent) or using hand driven stainless steel well point in areas with limited access. Groundwater samples will be collected from the same locations as soil borings as shown in Figure 2.

Hydropunch® or well point groundwater samples will be collected directly from the sample tubing after sufficient groundwater has accumulated. Disposable bailers, peristaltic pump, or similar sampling device will be used to collect a grab groundwater sample from each location. Groundwater samples will be analyzed for the following parameters:

- Volatile organic compounds by EPA Methods 8260B
- Dissolved metals by EPA Method 6010B (arsenic, cadmium, chromium, copper, iron, lead, nickel, silver and zinc)
- Mercury by EPA Method 7470A
- Hexavalent Chromium EPA Method 7196A

3.4 Concrete Chip Sampling

The concrete floors in the basement area of IWTP 32 are visually stained, and will require sampling to achieve closure of the facility. Additional concrete samples will be collected in the northern area of the ground floor near the plating tanks. Concrete chip sample locations are shown on Figure 3. Similarly, the concrete trench areas of IWTP 25 will also be sampled. The concrete flooring in the basement of IWTP 32 is covered with a protective resin coating. This coating will be removed prior to collecting concrete chip samples.

The basement concrete areas of IWTP 32 will be sampled on approximately 25 feet by 25 feet square grid system. Concrete chip samples will be collected from visually stained areas or near existing tanks or piping. If neither of the previous conditions exist in any one particular grid, then the concrete chip sample will be collected from the approximate center of each sampling grid. The ground floor samples will be collected from the locations shown in Figure 3. At IWTP 25, concrete chip samples will be collected from the same seven locations in the shallow concrete trenches where soil and groundwater will be collected.

Concrete chips will be obtained using hammer and chisels or other means to obtain near surface concrete chips, and will be analyzed for the following parameters:

- Metals by EPA Method 6010B (arsenic, cadmium, chromium, copper, iron, lead, nickel, silver and zinc)
- Mercury by EPA Method 7471A
- Hexavalent chromium by EPA Method 7196A
- Cyanide by EPA Method 9010B/9012A (IWTP 32 only)

Since concrete itself can contain a variety of materials, especially metals, the analytical results from concrete chips will be compared to "background" concrete samples collected from each IWTP. The background concrete sample will be collected from an area of concrete that is not visually stained and is outside of the main treatment plant area (i.e., outside of berms or trenches, entrance or office areas). Six background concrete samples will be collected from IWTP 25 from outside the outer berm. Six background concrete samples will be collected from IWTP 32 either on the first floor or other location away from the main treatment areas. The background samples will be analyzed for the same parameters shown above.

3.5 *IWTP 25 – Tanks, Equipment, and Piping*

Industrial Waste Treatment Plant 25 is an open-air facility, consisting primarily of steel and fiberglass tanks. A list of the tanks and equipment to be removed at IWTP 25 is shown in Table 4. Based on the age of IWTP 25, lead based paint may have been used at the facility. Suspected lead-based paint on tanks, equipment and pipes will be sampled prior to demolition. Paint chips will be collected from various areas around the facility and will be analyzed for lead using EPA Method 6010B. Or, Shaw may choose to subcontract lead-based paint survey, sampling and abatement activities. The results from paint chip analysis will be used to determine disposal options.

Since IWTP 25 is an open-air facility, rainwater may have accumulated in open tanks or vessels. If necessary, accumulated rainwater will be pumped out and combined with other site wastewater for disposal.

Industrial Waste Treatment Plant 25 tanks and equipment were cleaned and sampled in 1999, therefore no additional cleaning or sampling is anticipated for disposal. However, if upon inspection, residue or other indication of possible contamination is observed in the tanks (accumulated rain water will not be considered residue or contamination), the tanks will be rinsed and wipe samples will be collected if necessary for disposal.

If sampling becomes necessary, then wipe samples will be collected from the interior of the tanks/vessels for the chemicals appropriate to the process they contained, see Table 4.

The analysis performed may be changed at the request of the Shaw T&D Coordinator. Wipe samples will be analyzed for the following parameters:

- Semivolatile organic compounds (SVOCs) by EPA Method 8270C
- California Code of Regulations, Title 22 Metals by EPA Methods 6101B/7470
- Volatile organic compounds by EPA Method 8260B

Piping will be handled using the same procedure as tanks. If upon inspection, residue or other indication of possible contamination is observed, the pipes will be rinsed and wipe samples or rinsate samples will be collected for disposal profiling.

3.6 IWTP 32 – Tanks, Equipment, and Piping

Industrial Waste Treatment Plant 32 is an enclosed facility, consisting primarily of steel and fiberglass tanks and two concrete sumps. A list of the tanks and equipment to be removed at IWTP 32 is shown in Table 4. Based on the age of IWTP 32, lead based paint is not expected to be present on any equipment. However, if necessary for disposal, painted tanks, equipment or pipes may be sampled prior to demolition. Paint chips will be collected from suspect materials and will be analyzed for lead using EPA Method 6010B. Or, Shaw may choose to subcontract lead-based paint survey, sampling and abatement activities.

Industrial Waste Treatment Plant 32 tanks and equipment were cleaned and sampled in 1999; therefore, no additional cleaning or sampling is anticipated for disposal. However, if, upon inspection, residue or other indication of possible contamination is observed in the tanks, the tanks will be rinsed and wipe samples will be collected if necessary for disposal.

If sampling becomes necessary, then wipe samples will be collected from the interior of the tanks/vessels for the chemicals appropriate to the process they contained, see Table 4. Wipe samples will be analyzed for the following parameters:

- California Code of Regulations, Title 22 Metals by EPA Methods 6010B/7470
- Cyanide by EPA Method 9010B/9012A

The analysis performed may be changed at the request of the Shaw T&D Coordinator.

Piping will be handled using the same procedure as tanks. If, upon inspection, residue or other indication of possible contamination is observed, the pipes will be rinsed and wipe samples or rinsate samples will be collected for disposal profiling.

Two concrete sumps, chrome waste and cyanide waste, were observed to contain liquid during recent inspection. The sumps will be pumped out and cleaned prior to "in-place" closure. After cleaning, a sample of the final rinse water will be collected and will be analyzed for chromium (chrome waste sump) by EPA Method 6010B and cyanide (cyanide waste sump) by EPA Method 9012A.

3.7 Investigation-Derived Waste Streams

The project IDW will consist of tanks, piping, miscellaneous equipment, resin coating removed from the basement of IWTP 32, soil and wastewater from groundwater sampling, decontamination, and wastewater from the sumps at IWTP 32. Debris from the demolition of the IWTPs will be recycled (or disposed) off site. Analytical testing of debris is not anticipated or required for disposal.

3.7.1 Wastewater

All wastewater will be stored in U.S. Department of Transportation (DOT)-approved temporary storage tanks. Wastewater will be discharged to the Alameda POTW if concentrations meet the permit requirements. Sampling and analysis of wastewater will be based on the site-specific testing requirements determined by the POTW. The following parameters may be requested by the POTW:

- Volatile organic compounds by EPA Method 624/8260B
- Total petroleum hydrocarbons (TPH) as gasoline by EPA Method 8015B
- Total petroleum hydrocarbons as diesel and motor oil by EPA Method 8015B
- Total metals (arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel, silver, and zinc) by EPA Methods 200.7/245.1/6010B/7470
- Semivolatile organic compounds by EPA Method 625/8270C
- Phenolic Compounds by EPA Method 420.2
- Cyanide by EPA Method 335.2
- Oil and grease by EPA Method 1664 Hexane Extractable Material (HEM) with silica gel cleanup
- pH (Field Measurement)
- Temperature (Field Measurement)

If the wastewater does not meet the requirements for disposal at the POTW, then it will be transferred to an approved off-site facility for disposal. Changes in analyses or sampling frequency may be made based on disposal facility requirements or at the request of the Shaw T&D Coordinator.

3.7.2 Resin Coating Waste

The resin coating removed from the flooring in the basement of IWTP 32 will be stored in DOT-approved 55-gallon drums. One sample of this material will be collected for the following analyses to characterize the waste for disposal:

- California Code of Regulations, Title 22 Metals by EPA Methods 6010B/7470
- Cyanide by EPA Methods 9010B/9012A

Changes in analyses or sampling frequency may be made based on disposal facility requirements or at the request of the Shaw T&D Coordinator.

3.7.3 Waste Soil

Soil cuttings from hand-augering/soil boring activities will be stored in DOT-approved 55-gallon drums. Based on the volume generated, one four-point composite soil sample will be collected and analyzed for the following parameters prior to off-site disposal:

- Total petroleum hydrocarbon as diesel and as motor oil by EPA Method 8015B
- Semivolatile organic compounds by EPA Method 8270C
- California Code of Regulations, Title 22Metals by EPA Methods 6010B/7000A

Samples will first be collected as grab samples and then composited by the laboratory for the analyses shown above. Additionally, one discrete soil sample will be collected using an EnCore™ sampling device at a random location that will be analyzed for the following parameters:

- Total petroleum hydrocarbons as gasoline by EPA Method 5035/8015B
- Volatile organic compounds by EPA Methods 5035/8260B

If necessary, the following analyses will be performed to further characterize the waste classification of contaminated soil:

- Soluble Threshold Limit Concentrations by California Waste Extraction Test and EPA Method 6010B
- Toxicity Characteristic Leaching Procedure (TCLP) by EPA Methods 1311/6010B

The above analysis and sampling frequency may be changed at the request of the Shaw T&D Coordinator or per the receiving facilities requirements.

3.8 Analytical Requirements

Analytical methods to be used in this project are as follows.

Test Methods for Evaluating Solid Waste, Physical Chemical Methods, SW-846 (EPA, 1996) and *Methods for Chemical Analysis of Water and Wastes* (EPA, 1983):

- Soil and Groundwater Investigation
  - Metals by EPA Method 6010B/7470/7471A
  - Volatile organic compounds by EPA Method 8260B
  - Hexavalent Chromium by EPA Method 7196A
  - Cyanide by EPA Method 9010/9012
  - Closed System purge and trap by EPA Method 5035
- Waste Characterization Sampling

- Total petroleum hydrocarbons as gasoline by EPA Method 8015B
- Total petroleum hydrocarbons as diesel and motor oil by EPA Method 8015B
- Volatile organic compounds by EPA Method 8260B
- Semivolatile organic compounds by EPA Method 8270C
- California Code of Regulations, Title 22 Metals by EPA Methods 6010B/7470
- Cyanide by EPA Method 9010/9012
- Hexavalent Chromium by EPA Method 7196A/7199

Methods for Chemical Analysis of Water and Waste (EPA 1983)

- Cyanide by EPA Method 335.2
- Semivolatile organic compounds by EPA Method 625
- Phenolic compounds by EPA Method 420.2
- Oil and grease by EPA Method 1664 HEM with silica gel cleanup
- Metals by EPA Methods 200.7/245.1

Detailed information on methods, calibration criteria, project-required reporting limits, and QC acceptance criteria are presented Section 6.0, "Laboratory Quality Control Program."

3.9 Field Quality Control Samples

Field QC samples will be collected and analyzed during the project to assess the consistency and performance of the sampling program. Field QC samples for this project will include trip blanks, field duplicates, equipment rinsate samples (if necessary), temperature blanks, and wipe blanks.

3.9.1 Field Duplicates

Field duplicate pairs consist of two samples of the same matrix (one original and one duplicate) collected at the same time and location to the extent possible, using the same sampling techniques. The purpose of water field duplicate samples is to evaluate the sampling and analysis precision. Field duplicate samples will be collected for groundwater samples at a frequency of 10 percent, and will be analyzed for the same parameters as their corresponding original samples. Soil is heterogeneous by nature and the collection of soil field duplicates does not accurately represent sampling precision. Therefore, field duplicates will not be collected for soil samples and waste characterization samples (i.e., wastewater, waste soil, wipes or concrete samples).

3.9.2 Equipment Rinsate Samples

Equipment rinsate samples are used to evaluate the effectiveness of the decontamination procedure and to identify potential cross-contamination during sampling events. For this project, disposable sampling equipment will be used to collect soil and groundwater samples, which eliminates the need for equipment rinsate samples. However, if nondisposable sampling equipment is used rinsate samples will be collected daily for groundwater sampling equipment only. Rinsate samples consist of reagent-grade water collected from the final rinse of the decontamination process. Rinsate samples will be collected from the sample equipment, placed in appropriate pre-cleaned containers supplied by the analytical laboratory, and analyzed for the same analytes as the field samples.

3.9.3 Trip Blanks

Each cooler containing water samples for VOC analysis will contain a trip blank. Trip blanks are 40 milliliter volatile organic analysis (VOA) vials of analyte-free water, which are kept with the field sample containers from the time they leave the laboratory until the time they are returned to the laboratory. The purpose of trip blanks is to determine if samples have been contaminated with VOCs during transportation of sample collection. One trip blank is needed for each cooler containing groundwater samples for VOC analysis.

3.9.4 Temperature Blanks

Each cooler will be shipped with a temperature blank. A temperature blank is a sample container filled with tap water and stored in the cooler during sample collection and transportation. The laboratory will record the temperature of the temperature blank immediately upon receipt of the samples.

3.9.5 Matrix Spike and Matrix Spike Duplicate

The laboratory will analyze a matrix spike (MS)/matrix spike duplicate (MSD) for every 20 soil or groundwater samples collected. Field personnel will collected extra sample volume and designate one sample per every 20 for MS/MSD analysis on the Chain-of-Custody (COC) Form. Groundwater from Hydropunch® locations may not recharge sufficiently to collect the sample volumes necessary for MS/MSD. If this problem occurs, MS/MSD samples will not be collected for groundwater. Waste, concrete or wipe samples will not be submitted as MS/MSD samples.

3.9.6 Wipe Blanks

A wipe blank will consist of clean filter paper and deionize water (wipe solvent) sealed in an un-acidified VOA vial. A wipe blank will be used to document if sample collection materials or shipping/handling of wipe samples have introduced contamination to the project sample.

If wipe blanks are used to aid in disposal characterization, then one wipe blank will be submitted for the entire project to document that sample collection materials are free from contamination.

4.0 Field Methods and Sampling Procedures

This section describes container and preservative requirements; sample collection, decontamination, and management procedures.

4.1 Sample Containers, Preservatives, and Holding Times

Sample containers for soil will be certified pre-cleaned according to EPA protocols. Table 6, "Sample Containers, Preservatives, and Holding Times," lists the sample container, preservative, and holding time requirements for water samples.

4.2 Sampling Method Requirements

This section presents field methods and sampling procedures including groundwater sampling, decontamination, sample handling, and documentation procedures. The descriptions provided in this section summarize the important points of the IT SOPs included in the *IT Standard Quality Procedures and Standard Operating Procedures Manual* (IT, 2000b). The manual will be kept on file at the job site for the field personnel's reference. Copies of the SOPs will be made available to the overseeing regulatory agency upon written request to the Navy Remedial Project Manager.

4.2.1 Soil Sampling Procedure

Soil samples will be collected using direct-push techniques (GeoProbe®), hand augers or equivalent method depending on the accessibility of the sampling location. GeoProbe® drilling technique typically incorporates a2-inch minimum diameter outer casing and inner drive tube containing 1.5-inch diameter or equivalent acetate liners. The maximum acetate liner diameter will be utilized due to the volume of soil required for the different types of analyses. If soil samples are being collected using hand-angering equipment, then a drive tube with a stainless steel liner will be used to collect a sample from the desired depth. Soil samples will be collected following IT SOP 3.2 using the sampling techniques described below:

1. Direct the drilling subcontractor to the desired sampling location. Advance the drive tube (acetate liner) into the subsurface driving soil into the acetate liner. If using a hand auger, auger to the desired sampling depth and then use a slide hammer to drive soil into the stainless steel liner.

2. Remove the liner from the drive tube (or slide-hammer) and expose soil for sample collection.

3. Collect samples for VOCs as quickly as possible after exposing soil core. Use an EnCore™ device following IT SOP 3.5 (IT, 2001c) to obtain sample from the desired depth.

4. Collect soil for any remaining analysis into the appropriate sample containers using a disposable scoop (or equivalent). If using a stainless steel sleeve, the sleeve may be capped using Teflon sheeting and end-caps and submitted to the laboratory for the remaining analysis.

5. Label, package, and prepare the samples for shipment to the laboratory in accordance with the IT SOP 2.1 and 17.1 (IT, 2001c).

Sample locations will be surveyed for permanent sample location documentation.

4.2.2 Groundwater Sampling Procedure

Groundwater samples will be collected using either direct-push drilling techniques (Hydropunch® or equivalent) or using hand driven stainless steel well point in areas with limited access.

A brief description is provided below.

1. Direct the drilling subcontractor to the appropriate sample location or prepare the well point drive tube at the desired location.

2. Advance the decontaminated push rod/well point to the target depth.

3. When groundwater is encountered retract the probe to allow the groundwater to enter the temporary casing.

4. Measure the depth to water using an electronic water level indicator probe. Record the water level measurement to the nearest 0.01 of an inch in the field logbook. Sampling will occur when the water level stabilizes.

5. Collect groundwater samples using either a disposable (or decontaminated stainless steel) bailer or a peristaltic pump, whichever method best suits site conditions.

6. Fill the appropriate sample containers, shown in Table 6. Metals in groundwater will be analyzed as dissolved fraction only. If a peristaltic pump is used for sample collection, then the samples will be filtered for metals analysis in the field using a disposable in-line 0.45μm filter cartridge. If samples are collected using a bailer, collect total metals into an un-acidified high-density polyethylene sample container for filtering and preservation in the laboratory.

7. If the location does not produce enough water to collect all analyses, the priority of sampling will be as follows:

- Volatile organic compounds
- Metals
- Hexavalent Chromium

A sufficient amount of time will be allowed for water accumulation and maximum sample collected, however the sampling period will not exceed 24 hours.

8. Collect field quality control samples as required. If water recovery rates are insufficient to collect QC samples, then record this information in the field sampling log and collect only the primary sample.

9. Label, package, and prepare the samples for shipment to the laboratory in accordance with the appropriate IT SOP 2.1 and 17.1. Transfer the samples to cold storage after collection.

4.2.3 Wipe Sampling Procedure

Wipe samples from the interior of cleaned tanks, pipes or equipment will be collected in the following manner.

1. Submit one wipe blank per lot of media (filter paper). Collect one wipe sample per analytical test necessary.

2. Obtain a pre-weighed piece of filter paper from the laboratory (the filter paper will be shipped in a clean glass jar from the laboratory).

3. Put on a new (unused) pair of sampling gloves and other appropriate personal protective equipment.

4. Attach the filter paper to forceps clamps. Moisten the filter paper with a small amount of laboratory grade deionized organic free water.

5. With the filter paper, carefully wipe a 10-by-10-square centimeter area—first in the horizontal direction, and then in the vertical direction—covering the entire 10-square-centimeter area.

6. Place the filter paper into the certified clean jar with a Teflon®–lined lid.

7. Place a sample label, completed with the information described in Section 4.4.2, "Sample Labeling," on the sample jar.

8. Place the sample container in a resealable bag.

9. Package and prepare the samples for shipment to the laboratory in accordance with the IT SOPs 2.1 and 17.1. Transfer the samples to cold storage after collection.

4.2.4 Wastewater Sampling Procedure

Samples of wastewater that is stored in holding tanks or drums will be sampled using a disposable bailer using the following procedure:

1. Obtain an unused disposable bailer for each sampling event.

2. Put on a new, clean, and chemical-resistant pair of disposable gloves.
3. Tie the bailer to a nylon cord.
4. Lower the bailer into the liquid. Allow sufficient time for the bailer to fill with water.
5. Retrieve the bailer and fill appropriate sample bottle(s) for analyses being requested (see Table 1).
6. Label, package, and prepare the samples for shipment to the laboratory in accordance with the IT SOPs 2.1 and 17.1 (IT, 2000b). Transfer the samples to cold storage after collection.

4.3 Decontamination Procedure

It is anticipated that all sampling will be conducted using disposable sampling materials and therefore decontamination is not necessary. However, if nondisposable sampling equipment is used, then decontamination will be performed according to IT SOP 6.1 to prevent the introduction of extraneous material into samples, and to prevent cross-contamination between samples. All nondisposable sampling equipment will be decontaminated by washing with a non-phosphate detergent such as Liquinox™ or equivalent. Decontamination water will be collected in 55-gallon DOT-approved drums.

The following procedures will be used for decontamination of nondisposable sampling equipment:

1. Rinse with potable water (if necessary to remove mud or soil adhering to the tool). This step will decrease the gross contamination and reduce the frequency at which the nonphosphate detergent and water solution need to be changed. Change the water frequently.
2. Wash with the nonphosphate detergent and water solution. This step will remove remaining contamination from the equipment. The nonphosphate detergent will be diluted as directed by the manufacturer.
3. Rinse with potable water. This step will rinse the detergent solution away from the equipment. Change the water frequently.
4. Rinse with deionized water. This step will rinse any detergent solution and potable water residues. Rinsing will be done by applying the deionized water from a stainless steel Hudson-type sprayer, Nalgene™ squeeze bottle, or equivalent while holding equipment over a 5-gallon bucket.

4.4 Sample Management

The following sections describe sample numbering and labeling requirements.

4.4.1 Sample Numbering

All samples submitted to the analytical laboratory will be uniquely numbered according to the following system:

IWTP-X-ZZZ

Where X indicates which treatment plant (25 or 32) the samples came from and ZZZ a sequential unique number for each sample collected.

The sample number will be recorded in the field logbook at the time of sample collection. A complete description of the sample and sampling circumstances will be recorded in the permanently bound field logbook, and referenced to the unique sample identification number.

4.4.2 Sample Labeling

Sample labels will be filled out with indelible ink and affixed to each sample container. If nonwaterproof labels are used, then each sample label will be covered with clear tape to keep it dry. Sample containers will be placed in resealable plastic bags to protect the sample from moisture during transportation to the laboratory. Each sample container will be labeled with the following, at a minimum:

1. Sample identification number
2. Sample collection date (month/day/year)
3. Time of collection (24-hour clock)
4. Project number (i.e., 807181)
5. Sampler's initials
6. Analyses to be performed
7. Preservation (if any)
8. Location (Alameda Point)

4.4.3 Sample Packaging and Shipment

The shipping of samples to the analytical laboratory by land delivery services will be performed according to the DOT regulations. The International Air Transportation Association regulations will be adhered to when shipping samples by air courier services. Transportation methods will be selected to assure that the samples arrive at the laboratory in time to permit testing according to established holding times and project schedules. The receiving laboratory will accept no samples without a properly prepared COC Form, and properly labeled and sealed shipping container(s).

Packaging of sample containers will be based on the level of protection a sample will require during handling, shipping, and storage. Protection may vary according to sample type, sample media, suspected amount of hazardous substances, required testing, and handling and storage conditions. Proper packaging will be based on the following considerations:

1. Type and composition of inner packing (*e.g.*, plastic bags, metal cans, absorbent packing material, and ice for preservation)
2. Type and composition of overpacks (*e.g.*, metal or plastic coolers, cardboard box, rock core box, and undisturbed tube rack)
3. Method of overpack sealing (*e.g.*, strapping tape and custody seals)
4. Mark and label of overpacks (*e.g.*, laboratory address, any appropriate DOT Hazard Class Labels, and handling instructions)

Upon collection, samples will be handled according to IT SOP 2.1. Immediately after sample collection, sample labels will be affixed to each sample container. If nonwaterproof labels are used, each sample label will be covered with clear tape to keep the label dry. All sample bottles will be placed in a resealable plastic bag to keep the container dry. All glass sample containers will be protected with bubble wrap. A temperature blank will be placed in every cooler with samples.

Samples to be shipped by commercial carrier will be packed in a sample cooler lined with a plastic bag. Ice, double bagged in resealable bags, will be added to the cooler in sufficient quantity to keep the samples cooled to 4 ± 2 degrees Celsius for the duration of the shipment to the laboratory. Sample cooler drain spouts will be taped from the inside and outside of the cooler to prevent any leakage. Saturday deliveries will be coordinated with the laboratory.

If samples are picked up by a laboratory courier service, the COC Form will be completed and signed by the laboratory courier. The cooler will then be released to the courier for transportation to the laboratory.

If a commercial carrier is used, the COC Form will include the airbill number in the "transfers accepted by" column, and will be sealed in a resealable bag. The COC Form will then be taped to the inside of the sample cooler lid. The cooler will be taped shut with strapping tape, and two custody seals will be taped across the cooler lid: one seal in the front and one seal in the back. Clear tape will be applied to the custody seals to prevent accidental breakage during shipping. The samples will then be shipped to the analytical laboratory. A copy of the courier airbill will be retained for documentation.

5.0 Sample Custody and Documentation

Sampling information will be recorded on a COC Form, in a permanently bound field logbook, and Groundwater Monitoring Data Form. All entries will be legible and recorded in indelible ink.

5.1 Chain of Custody

Figure 5, "Chain of Custody," will be completed according to the requirements of IT SOP 1.1. In addition to providing a custody exchange record for the samples, the COC Form serves as a formal request for sample analyses. The COC Forms will be completed, signed, and distributed as follows:

- One copy retained by the sample coordinator for inclusion in the project files
- The original sent to the analytical laboratory with the sample shipment.

After the laboratory receives the samples, the Sample Custodian will inventory each shipment before signing for it, and note on the original COC Form any discrepancy in the number of samples, temperature of the cooler, or broken samples. The Project Chemist will be notified immediately of any problems identified with shipped samples. The Project Chemist will notify in turn, the Project QC Manager, and together they will determine the appropriate course of action. The Project Chemist will also notify the Project Manager if the project budget and schedule may be impacted.

The laboratory will initiate an internal COC Form that will track the sample within the various areas of the laboratory. The relinquishing signature of the Sample Custodian and the custody acceptance signature of the laboratory personnel transfer custody of the sample. This procedure is followed each time a sample changes hands. The laboratory will archive the samples and maintain their custody as required by the contract or until further notification from the Project Chemist, at which time the samples will either be returned to the project for disposal or disposed of by the laboratory.

5.2 Field Sample Custody

The COC Form will be the controlling document to assure that sample custody is maintained. Sampling personnel upon collecting a sample will initiate the COC Form in the field. Each individual who has the sample(s) in his/her possession will sign the COC Form. Each time the sample custody is transferred, the former custodian will sign the COC Form on the "Relinquished by" line, and the new custodian will sign the COC Form on the "Received by" line. The date, time, and name of their project or company affiliation will accompany each signature.

The waybill number or courier name will be recorded on the COC Form when a commercial carrier is used. The shipping container will be secured with two custody seals, thereby allowing shipping personnel to maintain custody until receipt by the laboratory.

If the laboratory sample custodian judges sample custody to be invalid (*e.g.,* custody seals have been broken), the laboratory will initiate a Nonconformance Report. The Project Chemist will be immediately notified. The Project Chemist will notify in turn, the Project Manager and the Project QC Manager. The Project Manager will make a decision, in consultation with the client, as to the fate of the sample(s) in question on a case-by-case basis. The sample(s) will either be processed "as is" with custody failure noted along with the analytical data, or rejected with re-sampling scheduled, if necessary. The nonconformance associated with the samples will be noted on the appropriate certificate of analysis or case history.

5.3 Field Logbooks

A permanently bound field logbook with consecutively numbered pages will be assigned to this project. All entries will be recorded in indelible ink. Corrections will be made following the procedure described in Section 5.4, "Document Corrections." At the end of each workday, the responsible sampler will sign the logbook pages, and any unused portions of a logbook page will be crossed out, signed, and dated.

If it is necessary to transfer the logbook to another person, the person relinquishing the logbook will sign and date the last page used, and the person receiving the logbook will sign and date the next page to be used.

At a minimum, the logbook will contain the following information:

1. Project name and location (on the front page of the logbook)
2. Date and time of collection for each sample in the upper right corner of each page
3. Sample number
4. Sample location (i.e., soil boring, sampling point, and monitoring well identifications)
5. Sample type (i.e., soil and water)
6. Composite or grab
7. Composite type (the number of grab samples)
8. Depth of sample
9. Weather information (*e.g.,* rain, sunny, approximate temperature, etc.)

10. Containers used (*e.g.,* metal liners, glass bottles, etc.)

11. Requested analysis

In the graph paper portion of the Field Logbook, fill in the following information:

1. Draw a map with sample locations or paste a copy of a map. Each sample location must be clearly identified on the map. Several sample locations may be presented on one page, refer to this page on the individual sample pages.
2. Field analyses performed, including results, instrument checks, problems, and calibration records for field instruments.
3. Descriptions of deviations from this SAP.
4. Problems encountered and corrective action taken.
5. Identification of field QC samples.
6. List of QC activities.
7. Verbal or written instructions from the Navy and Shaw Project QC Manager.
8. Any other events that may affect the samples.

Cross out the unused portion and sign each page.

5.4 Document Corrections

Changes or corrections on any project documentation will be made by crossing out the item with a single line, initialing by the person performing the correction, and dating the correction. The original item, although erroneous, will remain legible beneath the cross-out. The new information will be written above the crossed-out item. Corrections will be written clearly and legibly with indelible ink.

6.0 Laboratory Quality Control Program

This section describes analytical QC procedures, including laboratory qualifications, the QA program, and QC procedures associated with analytical methods.

6.1 Laboratory Quality Control Checks

The recovery of known additions is a part of laboratory analytical protocols. The use of additives at known concentrations allows detecting the matrix interferences and estimating the impact of these interferences when present. It also allows evaluating the efficiency of extraction procedures and overall accuracy of analysis. Laboratory internal QC checks will include:

- Laboratory control samples (LCSs)
- Laboratory control duplicates (LCDs)
- MSs
- MSDs
- Laboratory duplicates
- Surrogate standards
- Internal standards
- Method and instrument blanks
- Post-digestion spikes

6.1.1 Laboratory Control Samples

Laboratory control samples are matrix equivalent QC check samples (i.e., analyte-free water, laboratory sand, or sodium sulfate) spiked with a known quantity of specific analytes that are carried through the entire sample preparation and analysis process. The spiking solution used for LCS/LCD preparation is of a source different from the stock that was used to prepare calibration standards.

6.1.2 Laboratory Duplicates

For laboratory sample duplicate analyses, a sample is prepared and analyzed twice. Laboratory sample duplicates are prepared and analyzed with each batch of samples for most inorganic analyses.

6.1.3 Matrix Spikes

Matrix spikes are QC check samples that measure matrix-specific method performance. An MS sample is prepared by adding a known quantity of target analytes to a sample prior to sample digestion or extraction. In general, for organic compound and metal analyses, an MS/MSD pair is prepared and analyzed with each preparation batch or for every 20 field samples. The frequency of MS/MSD analysis depends on the project DQOs. For inorganic compound analysis, a single MS and a laboratory sample duplicate are often prepared and analyzed with each batch. The LCS results, together with MS results, allow verifying the presence of matrix effects.

6.1.4 Surrogate Standards

Organic compound analyses include the addition, quantitation, and recovery calculation of surrogate standards. Compounds selected to serve as surrogate standards must meet all of the following requirements:

- Are not the target analytes
- Do not interfere with the determination of target analytes
- Are not naturally occurring, yet are chemically similar to the target analytes
- Are compounds exhibiting similar response to target analytes

Surrogate standards are added to every analytical and QC check sample at the beginning of the sample preparation. The surrogate standard recovery is used to monitor matrix effects and losses during sample preparation. Surrogate standard control criteria are applied to all analytical and QC check samples, and if surrogate criteria are not met, re-extraction and re-analysis may be performed.

6.1.5 Internal Standards

Some organic compound analyses include the addition, quantitation, and recovery calculation of internal standards. Internal standards are usually synthetic compounds, which are similar in chemical behavior to the target analytes. They are added to sample extracts at the time of instrument analysis, and are used to quantitate results through internal standard calibration procedures. Internal standard recoveries are used to correct for injection and detector variability. Gas chromatography/mass spectrometry (GC/MS) must use internal standards and have acceptability limits for internal standard areas (see Table 12, "Gas Chromotagraphy/Mass Spectrometry Data Deliverables Package Requirements"). Use of internal standard quantitation for gas chromatography (GC) methods is optional.

6.1.6 Method Blanks

A method blank is used to monitor the laboratory preparation and analysis systems for interferences and contamination from glassware, reagents, sample manipulations, and the general laboratory environment. A method blank is carried through the entire sample preparation process, and is included with each batch of samples. Some methods of inorganic analysis do not have a distinctive preparation step. For these tests the instrument blank, which contains all reagents used with samples, is considered the method blank.

6.1.7 Instrument Blanks

An instrument blank is used to monitor the cleanliness of the instrument portion of a sample analysis process. Instrument blanks are usually just the solvent or acid solution of the standard used to calibrate the instrument. During metals analyses one instrument blank is usually analyzed for every ten samples. For GC and GC/MS analysis, instrument blanks are analyzed on an as-needed basis for troubleshooting and chromatography column carryover determination purposes (see Table 13, "Metals Data Deliverables Package Requirements").

6.1.8 Post-Digestion Spikes and the Method of Standard Addition

A post-digestion spike is used during metal analysis to assess analytical interferences that may be caused by general matrix effects or high concentrations of analytes present in the sample. A digested sample is spiked with the analyte of interest at a known concentration, and the spike recovery is used to estimate the presence and magnitude of interferences.

If a post-digestion spike recovery fails to meet acceptance criteria, the Method of Standard Addition (MSA) will be used to quantitate the sample result. The MSA technique compensates for a sample constituent that enhances or depresses the analyte signal. To perform the MSA, known amounts of a standard at different concentrations are added to 2 to 3 aliquots of digested sample, and each spiked sample and the original unspiked sample are analyzed. The absorbance is then plotted against the concentration, and the resulting line is extrapolated to zero absorbance. The point of interception with the concentration axis is the indigenous concentration of the analyte in the sample.

6.2 Data Quality Indicators

This section defines the data quality indicators and their use for assessment of data quality.

6.2.1 Precision

Precision measures the reproducibility of measurements under a given set of conditions. The following equation illustrates the method for calculating relative percent difference (RPD) to assess a method's precision:

$$\text{Precision as RPD} = \frac{2 \text{ x } (\text{Result} - \text{Duplicate Result})}{\text{Result} + \text{Duplicate Result}} \text{ x } 100\%$$

The laboratory uses MS/MSD pairs to assess the precision of analytical procedures, with one MS/MSD pair analyzed for every batch of up to 20 samples. According to the Navy requirements, analytical laboratories perform MS/MSD on the Navy project samples. This allows determining whether matrix interferences may be present.

The laboratory uses LCS/LCD pairs when MSs are not practical due to the nature of sample or analytical method used, and they are prepared and analyzed with each batch of samples instead of MS/MSD. An LCS/LCD may also be prepared in place of an MS/MSD in the case that a sufficient sample volume was not obtained in the field to perform the MS/MSD analysis. For inorganic analyses, analytical precision is usually calculated based on the sample and sample duplicate results.

The analytical laboratory will have statistically-based acceptability limits for RPDs established for each method of analysis and sample matrix. The laboratory will review the QC samples to ensure that internal QC data lie within the limits of acceptability. Any suspect trends will be investigated and corrective actions taken.

Field precision of sampling procedures can be evaluated by collecting and analyzing "blind" field duplicate samples (field QC samples) at a rate of one for every ten samples. However, field duplicate precision is highly dependent on the variability of contaminant distribution. Sampling precision will be evaluated based on the RPD for field duplicate samples with the understanding that this type of contamination is highly heterogeneous. The field precision acceptability limits will be 50 percent for all soil sample analyses.

Field precision will be monitored for evaluation of the sampling techniques and sample handling procedures. Analytical data will not qualify during the data validation process, based on the field precision values.

6.2.2 *Accuracy*

Accuracy measures the bias of an analytical system by comparing the difference of a measurement with a reference value. The percent recovery of an analyte, which has been added to the environmental samples at a known concentration before extraction and analysis, provides a quantitation tool for analytical accuracy. The spiking solutions used for accuracy determinations are not used for instrument calibrations.

The following equation illustrates how accuracy is evaluated:

$$\text{Accuracy as percent recovery} = \frac{\text{Spiked Sample Result - Sample Result}}{\text{Spiked Sample True Value}} \times 100\%$$

Percent recoveries for MS, MSD, and LCS that are analyzed for every batch of up to 20 samples serve as a measure of analytical accuracy. Surrogate standards are added to all samples, blanks, MS, MSD, and LCS analyzed for organic contaminants to evaluate accuracy of the method and help to determine matrix interferences.

As a general rule, the recovery of most compounds spiked into samples is expected to fall within a range of 70 to 130 percent. This range represents the EPA advisory acceptability limits for MS, MSD, and LCS for all organic analysis methods. The EPA advisory limits for metal analysis at 75 to 125 percent. The surrogate standard advisory acceptability limits are also 70 to 130 percent for all organic analyses with the exception of GC/MS methods, where these limits are specified in the methods for each matrix. Laboratories may use the advisory limits until the in-house statistically-based control limits are developed for each method of analysis and sample matrix.

Control limits are defined as the mean recovery, plus or minus three standard deviations, of the 20 data points, with the warning limits set as the mean, plus or minus two standard deviations. The laboratory will review the QC samples and surrogate standard recoveries for each analysis to ensure that internal QC data lay within the limits of acceptability. The laboratory will investigate any suspect trends and take appropriate corrective actions.

6.2.3 Representativeness

Unlike precision and accuracy, which can be expressed in quantitative terms, representativeness is a qualitative parameter. Representativeness is the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. A qualitative parameter depends on proper design of the sampling program.

Field personnel will be responsible for ensuring that samples are representative of field conditions by collecting and handling samples according to the approved SAP and field SOP. Errors in sample collection, packaging, preservation, or COC procedures may result in samples being judged non-representative and may form a basis for rejecting the data.

Data generated by the laboratory must be representative of the laboratory database of accuracy and precision measurements for analytes in different matrices. Laboratory procedures for sample preparation will ensure that aliquots used for analysis are representative of the whole sample. Aliquots to be analyzed for volatile parameters will be removed before the laboratory composites/homogenizes the samples, to avoid losing volatile compounds during mixing.

6.2.4 Comparability

Comparability is a qualitative parameter expressing the confidence where one data set can be compared with another, whether it was generated by a single laboratory or during inter-laboratory studies. The use of standardized field and analytical procedures ensures comparability of analytical data.

Sample collection and handling procedures will adhere to EPA-approved protocols. Laboratory procedures will follow standard analytical protocols, use standard units and standardized report formats, follow the calculations as referenced in approved analytical methods, and use a standard statistical approach for QC measurements.

6.2.5 Completeness

Completeness is a measure of whether all the data necessary to meet the project have been collected. For the data to be considered complete, they must meet all acceptance criteria including accuracy and precision and other criteria specified for an analytical method. The data will be reviewed and/or validated to keep invalid data from being processed through data collection. Completeness is evaluated using the following equation:

$$\text{Completeness} = \frac{\text{Acceptable Results}}{\text{Total Results}} \times 100\%$$

The goal for completeness for all QC parameters, except holding times, will be 90 percent. The goal for holding times will be 100 percent. If these goals are not achieved, the sources of non-conformances will be evaluated to determine whether resampling and re-analysis is necessary.

6.3 Project-Required Reporting Limits

Following the Navy requirements (NFESC, 1999), the laboratory will determine the Method Detection Limits (MDLs) for each method, instrument, analyte, and matrix by using the procedure described in 40 Code of Federal Regulation Part 136B. The MDL is defined as the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero.

An MDL study involves preparation/digestion and analysis of seven replicates of a given matrix spiked with target analytes at concentrations two to five times greater than the estimated MDL. The MDLs for metals in soil will be derived from the MDLs for metals in water. At a minimum, the laboratory will conduct annual MDL studies. The laboratory will select the practical quantitation limits (PQL) for all analytes at concentration levels that exceed the calculated MDLs by a factor of two to ten.

Reporting limits for the project are presented in Table 2. These limits may be elevated for individual samples if matrix interferences are encountered.

7.0 Laboratory Quality Assurance

The following sections describe the QC and QA procedures the analytical laboratory will follow to generate defensible data of known quality for the project.

7.1 Laboratory Qualifications

The analytical laboratories selected to analyze samples for this project will be certified by the California Department of Health Services through the Environmental Laboratory Accreditation Program for all analytical methods required for the project. In addition, the laboratory will successfully complete the NFESC's Laboratory Evaluation Program prior to sampling activities, and maintain that status throughout the project.

Laboratories selected for the project must be capable of providing the required turnaround times, project QC, and data deliverables required by this SAP.

7.2 Laboratory Quality Assurance and Quality Control Program

Quality assurance is a set of operating principles that, if strictly followed during sample collection and analysis, will produce defensible data of known quality. Included in QA are QC and quality assessments. Quality control is a set of measures within a sample analysis methodology to assure that the process is in control. Quality assessment consists of procedures for determining the quality of laboratory measurements by use of data from internal and external QC measures.

A properly designed and executed QC program will result in a measurement system operating in a state of statistical control, which means that errors have been reduced to acceptable levels. An effective QA program includes the following elements:

- Certification of operator competence
- Internal QC checks, such as recovery of known additions through use of surrogate standards, MSs, and LCSs
- Analysis of externally supplied standards
- Analysis of reagent blanks
- Calibration with standards using internal or external standard procedures
- Calibration verification with second source standard
- Analysis of duplicates
- Maintenance of control charts

Strict adherence to Good Laboratory Practices and consistent use of SOPs are also essential for a successful QC program. The laboratory will have the current revisions of the SOPs readily available for all staff. At a minimum, SOPs will be written for the following procedures and methods:

- Sample receipt/control/disposal
- Sample preparation/extraction
- Sample analysis
- Results calculation
- Database management
- Health and safety
- Corrective action

The analytical laboratory will have written SOPs defining the instrument operation and maintenance, tuning, calibration, MDL determination, QC acceptance criteria, blank requirements, and stepwise procedures for each analytical method. The SOPs will be available to the analysts in the laboratory. Any method that is subcontracted by the laboratory to another laboratory, or sent to another facility of the same network of laboratories, will have a prior approval of the Shaw Project Chemist.

7.3 Calibration

All instruments will be calibrated and the calibration acceptance criteria met before samples are analyzed. Calibration standards will be prepared with National Institute for Standards and Testing-traceable standards and analyzed per methods requirements. Initial calibration acceptance criteria documented in the laboratory SOPs will meet those of applicable guidance documents. The initial calibration will meet one of the following requirements:

- The lowest concentration of the calibration standard is less than or equal to the PQL based on the final volume of extract or sample.
- For each target analyte, at least one of the calibration standards will be at or below the regulatory limit (action level) as defined by the DQOs.

Before samples are analyzed, initial calibration will be verified with a second source standard prepared at the mid-point of the calibration curve. Initial calibration verification will meet the acceptance criteria, which are expressed in the laboratory SOPs (IT, 2000b).

Daily calibration verification will be conducted at the method-prescribed frequencies, and will meet the acceptance criteria of applicable guidance documents. Daily calibration verification will not be used for quantitation of target analytes.

Calibration data (calibration tables, chromatograms, instrument printouts, and laboratory logbooks) will be clearly labeled to identify the source and preparation of the calibration standard and, therefore, be traceable to the standard preparation records.

Calibration requirements and acceptance criteria for organic and inorganic analysis are summarized in Tables 7 through 11.

7.4 Preventive Maintenance

The primary objective of a preventive maintenance program is to help ensure the timely and effective completion of a measurement effort by minimizing the down time of crucial analytical equipment due to expected or unexpected component failure. In implementing this program, efforts are focused in three primary areas: maintenance responsibilities, maintenance schedules, and adequate inventory of critical spare parts and equipment.

Maintenance responsibilities for laboratory equipment are assigned to the respective laboratory managers. The laboratory managers then establish maintenance procedures and schedules for each major equipment item. These are contained in the maintenance logbooks assigned to each instrument.

The effectiveness of any maintenance program depends, to a large extent, on adherence to specific routine maintenance for each major equipment item. Other maintenance activities may also be identified as requiring attention on an as-needed basis. Manufacturers' recommendations and/or sample throughput provide the basis for the established maintenance schedules, and manufacturers' service contracts provide primary maintenance for many major instruments (*e.g.*, GC/MS instruments, atomic absorption spectrometers, analytical balances, etc.). Maintenance activities for each instrument are documented in a maintenance log.

Along with a schedule for maintenance activities, an adequate inventory of spare parts is required to minimize equipment down time. This inventory emphasizes those parts (and supplies), which are subject to frequent failure, have limited useful lifetimes, or cannot be obtained in a timely manner should failure occur.

The respective laboratory managers are responsible for maintaining an adequate inventory of necessary spare parts. Sufficient equipment is on hand to continue analyses in the event that an instrument encounters problems. In addition to backup instrumentation, a supply of spare parts such as GC columns, fittings, and septa; atomic absorption lamps, mirrors, and diaphragms; graphite furnace tubes; and other ancillary equipment is maintained.

7.5 Training

The laboratory will have an established policy and procedure on training and documenting of the analyst's competency. Each staff member that performs sample preparation and analysis will demonstrate their proficiency through preparation and analysis of four LCSs as described in the EPA SW-846 (EPA, 1996). An analyst will be considered proficient if the acceptance criteria for method accuracy and precision are met. The laboratory will maintain all training records on file.

7.6 Supplies and Consumables

The laboratory will inspect supplies and consumables prior to their use in analysis. The materials specifications in the analytical methods will be used as a guideline for establishing the acceptance criteria for these materials. Purity of reagents will be monitored by analysis of method blanks. An inventory and storage system for materials and supplies will assure use before manufacturers' expiration dates and storage under safe and chemically compatible conditions.

7.7 Software Quality Assurance

The generation, compilation, and reporting of electronic data are critical components of laboratory operations. To produce defensible data of known quality, the laboratory will develop a software QA plan or a SOP, which describe activities related to data generation, reduction, and transfer with modern tools of data acquisition, and the policies and procedures for procurement, modification, and use of computer software.

7.7.1 Software Validation

The laboratory will have procedures in place to ensure that all software for data reduction, reporting, and transfer adequately and correctly performs all intended functions, and does not perform any unintended functions.

The laboratory will verify, validate, and document the proper functioning of the software immediately after any new data acquisition and/or management systems have been installed at the laboratory.

The baseline verification and validation may include the following actions:

- Comparison of the computer printouts with reduced data and the raw data
- Manual calculations to confirm correctness of all computer calculations
- Comparison of the analytical report to the electronic deliverable files

Baseline software validation will be documented in laboratory QA files. Continuing software verification will take place during sample analysis. To eliminate data entry errors during analytical sequence set-up, as part of data package review, the correctness of results will be checked by one manual calculation per QC batch during data review. This verification will be documented in the QA/QC checklist for each data file.

7.7.2 Software Security

Only authorized and trained laboratory personnel will have access to the operating and data management software. Each analyst will be trained in software use for operating different functional areas of the software systems and have a password that allows access to these areas.

7.7.3 Manual Integration

Manual integration is sometimes necessary for proper compound quantitation in cases when there are overlapping or tailing peaks, and sloping baselines. When justified, manual integration can be conducted for standards, samples, and QC check samples.

Manual integration may include valley-to-valley baselines, vertical peak separation, or slope integration. The type of manual integration is a judgment call of an analyst experienced in GC.

If a need for manual integration arises, the analysts performing analysis will select a proper approach based on their professional judgment. Manual integration will then be conducted and documented in the data file. Once an approach has been selected, it will be consistently used for the similarly affected peaks.

Manual integration documentation will include a copy of a computer-integrated chromatogram, a copy of a manually-integrated chromatogram, a brief justification description, and the name of the person who performed the manual integration. The Laboratory Manager will review and approve all manual-integration's performed by analysts.

8.0 Laboratory Corrective Action

Corrective action takes place when a circumstance arises that has a negative impact on the quality of the analytical data generated during sample analysis. For corrective action to be initiated, awareness of a problem must exist. In most instances, the individuals performing laboratory analyses are in the best position to recognize problems that will affect data quality. Keen awareness on their part can frequently detect minor instrument changes, drifts, or malfunctions, which can then be corrected, thus preventing a major breakdown in the QC system in place. If major problems arise, they are in the best position to recommend the proper corrective action and initiate it immediately, thus minimizing data loss. Therefore, the laboratory personnel will have a prime responsibility for recognizing a nonconformance and the need for implementing and documenting the corrective action. If a situation arises requiring corrective action, the following closed-loop corrective action process will be used:

1. Define the problem.
2. Assign responsibility for investigating the problem.
3. Investigate and determine the cause of the problem.
4. Determine corrective action course to eliminate the problem.
5. Assign responsibility for implementing the corrective action.
6. Determine the effectiveness of the corrective action and implement the correction.
7. Verify that the corrective action has eliminated the problem.
8. If not completely successful, return to Step 1.

The personnel identifying or originating a nonconformance will document it to include the following items:

- Identification of the individual(s) identifying or originating the nonconformance
- Description of the nonconformance
- Any required approval signatures
- Method(s) for corrective action or description of the variance granted
- Schedule for completing corrective action

All affected project samples will be listed on a Nonconformance/Corrective Action Report. The Laboratory Project Manager will notify the Shaw Project Chemist of any laboratory nonconformance affecting the samples. Nonconformance/Corrective Action Reports will be submitted to Shaw as part of data packages. Corrective action procedures for different types of analysis are presented in Tables 7 through 11.

8.1 Batch Corrective Action

Analytical laboratory processes are batch processes, and the batch is a basic unit for the frequency of some QC elements. A batch is a group of samples of similar matrix that behave similarly with respect to the procedures being employed. The following three types of batches can be identified at the analytical laboratory:

- Preparation batch
- Instrument batch
- Sample delivery group (SDG)

A preparation batch is a group of up to 20 field samples, which are prepared (*e.g.*, extracted or digested) simultaneously or sequentially without interruption. Samples in each batch are of similar matrix (*e.g.*, soil, sludge, liquid waste, and water), are treated in a similar manner, and are processed with the same lots of reagents. For organic compound analyses, each batch will contain a method blank, an LCS, and an MS/MSD pair. For inorganic compound analyses, each batch will contain a method blank, an LCS, an MS, and a sample duplicate. These QC check samples are not counted into the maximum batch size of 20.

An instrument batch is a group of samples, which are analyzed within the same analytical run sequence. If the continuous operation of an instrument is interrupted (*e.g.*, shut down for maintenance, etc.), a new instrument batch must be started. The instrument batch includes an instrument blank, calibration check standards, extracts/digestates of the field samples, and QC check samples. The number of samples in the analytical batch is not limited, but the frequency of the calibration check standard and instrument blank analysis is mandated in each particular method.

For VOC analyses by GC or GC/MS, the preparation and instrument batch are the same, since the sample preparation (purge and trap) is performed as part of the instrument analysis. For these analyses, a batch is defined as a group of up to 20 field samples that are sequentially loaded on the instrument and analyzed as a single analytical run sequence. Laboratory QC check samples (i.e., method blank, an LCS, and an MS/MSD pair) will be analyzed as part of the batch in addition to 20 field samples, as well as the calibration standard per method requirements.

For Contract Laboratory Program analyses, an SDG is defined as a group of 20 or fewer samples within a project that are received over a period of 14 days or less. An SDG is primarily a reporting format and is not limited to sample receipt groups, preparation batches, or analytical batches.

Method QC acceptance criteria determine whether a method is performing within acceptable limits of precision and accuracy. There is a method component and a "matrix" component to this determination. The method component measures the performance of the laboratory analytical processes during the sample analyses. The matrix component measures the method performance on a specific matrix. Some QC elements uniquely measure the laboratory component of method performance, but all QC elements measuring the matrix component, contain the method component.

Method blanks and LCSs uniquely measure the method performance. Matrix spikes, MSDs, laboratory sample duplicates, surrogate standards, and post-digestion spikes measure the matrix component of method performance.

8.2 Method Blank

The method blank measures laboratory-introduced contamination for the sample batch and batch corrective action is initiated when contamination is found. It may include re-analysis of the blank; re-analysis of the samples; re-preparation and re-analysis of the blank, QC, and samples; and assessment of the impact of the contamination on batch sample data. Although it is a goal to have no detected target analytes in the method blanks, analytes may be periodically detected in blanks due to the nature of the analysis or the reporting limit for the analyte. For example, methylene chloride, acetone, and 2-butanone may sometimes be found in blanks for VOC analysis and the phthalate esters may sometimes be found in the blanks for SVOC analyses.

A method blank will be considered acceptable where target analytes are present at concentrations where the conditions are less than the following:

- One half of the PQLs
- 5 percent of the regulatory limits for these analytes

If the method blank results do not meet these acceptance criteria, the laboratory will initiate corrective action.

The first step of corrective action is to assess the effect on the samples. For example, if an analyte is found only in the blank, but not in any of the associated samples, or if the target analyte in the blank is less than 1/20 the value in the sample, no corrective action is necessary.

If corrective action is required, the method blank and any samples containing the same contaminant will be re-analyzed. If the contamination remains, the contaminated samples of the batch would be re-extracted and re-analyzed with a new method blank and QC check samples.

8.3 Laboratory Control Sample

An LCS must meet the accuracy acceptance criteria for target analytes for the batch to be considered acceptable. If the target analytes are outside of the acceptance limits, corrective action will be initiated. Corrective action will include re-extraction and re-analysis of the whole batch, including method blanks, samples, and QC check samples.

If MSs are not conducted, an LCS/LCD pair will be analyzed with each batch of samples. If the LCS/LCD are outside method acceptance criteria for accuracy and precision, the whole batch will be re-extracted and re-analyzed, including method blanks, samples, and QC check samples.

8.4 Matrix Spike and Matrix Spike Duplicate

An MS/MSD pair is included with each batch of samples for organic compound analyses and MS and laboratory sample duplicates are included with each batch of samples for inorganic compound analysis. These QC check samples allow evaluating the accuracy and precision of analysis and the influence of matrix effects.

Matrix spike data evaluation is more complex than blank or LCS data evaluation since MSs measure matrix effects in addition to sample preparation and analysis effects. Sample heterogeneity, lithological composition of soil, and presence of interfering chemical compounds often negatively affect precision and accuracy of analysis. If the native concentration of target analytes in the sample chosen for spiking is high relative to the spiking concentration, the differences in the native concentration between the unspiked sample and the spiked samples may contribute a significant error in the precision and accuracy. The accuracy and precision in this case are not representative of the true method and matrix performance.

If the accuracy of MS/MSD analysis is outside the acceptability limits for any target analyte, the LCS will be evaluated. If the LCS accuracy limits are met, the MS/MSD recovery problem will be identified as matrix effect and no further action will be required. If the LCS accuracy limits are not met, corrective action will be implemented, and the affected samples and associated QC samples will be re-prepared and re-analyzed.

If the MS/MSD or sample/sample duplicate pair fail in precision due to observed matrix interferences, sample inhomogeneity or the nature of the contaminant, corrective action will not be required, and the laboratory will make an appropriate notation in the case narrative.

8.5 Individual Sample Corrective Action

In addition to batch corrective action, individual samples within a batch may also require corrective action. Re-extraction and re-analysis of individual samples will take place in the following situations:

- Surrogate standard recoveries are outside acceptability limits.
- Internal standard areas for GC/MS analyses are outside acceptability limits.

Errors have been made during sample preparation, and results of analysis are not conclusive.

9.0 Data Management

This section describes the data management procedures for data review, verification, reporting, and validation.

9.1 Data Reduction, Verification, and Reporting

All analytical data generated by the laboratory in support of the SWDiv RAC projects will be reviewed prior to reporting to assure the validity of reported data. This internal laboratory data review process will consist of data reduction, three levels of documented review, and reporting. Review processes will be documented using appropriate checklist forms, or logbooks, that will be signed and dated by the reviewer.

9.1.1 Data Reduction

Data reduction involves the mathematical or statistical calculations used by the laboratory to convert raw data to the reported data. The laboratory will perform reduction of analytical data as specified in each of the appropriate analytical methods and laboratory SOPs. For each method, all raw data results will be recorded using method-specific forms or a standardized output from each of the various instruments.

All data calculations will be verified and initialed by personnel both generating and approving them. All raw and electronic data, notebook references, supporting documentation, and correspondence will be assembled, packaged, and stored for a minimum of 10 years for future use. All reports will be held client confidential. If the laboratory is unable to store project-related data for 10 years, then it is the responsibility of the laboratory to contact Shaw to make alternative arrangements.

9.1.2 Laboratory Data Verification and Review

The laboratory analyst who generates the analytical data will have the primary responsibility for the correctness and completeness of data. Each step of this verification and review process will involve the evaluation of data quality based on both the results of the QC data and the professional judgment of those conducting the review. This application of technical knowledge and experience to the evaluation of data is essential in ensuring that data of known quality are generated consistently. All data generated and reduced will follow well-documented in-house protocols.

9.1.2.1 Level 1: Technical (Peer) Data Review

Analysts will review the quality of their work based on an established set of guidelines, including the QC criteria established in each method, in this SAP, and as stated within the laboratory QA Manual. This review will, at a minimum, ensure that the following conditions have been met:

- Sample preparation information is correct and complete.
- Analysis information is correct and complete.
- Appropriate SOPs have been followed.
- Calculations are verified.
- There are no data transposition errors.
- Analytical results are correct and complete.
- Quality control samples are within established control limits.
- Blanks and LCSs are within appropriate QC limits.
- Special sample preparation and analytical requirements have been met.

Documentation is complete, for example, any anomalies and holding times have been documented and forms have been completed.

9.1.2.2 Level 2: Technical Data Review

A supervisor or data review specialist whose function is to provide an independent review of data packages will perform this review. This review will also be conducted according to an established set of guidelines and will be structured to verify the following finding of Level 1 data review:

- All appropriate laboratory SOPs have been followed
- Calibration data are scientifically sound, appropriate to the method, and completely documented
- Quality control samples are within established guidelines
- Qualitative identification of contaminants is correct
- Manual integrations are justified and properly documented
- Quantitative results and calculations are correct
- Data are qualified correctly
- Documentation is complete, for example, any anomalies and holding times have been documented and appropriate forms have been completed
- Data are ready for incorporation into the final report
- The data package is complete and complies with contract requirements

The Level 2 review will be structured so that all calibration data and QC sample results are reviewed and all of the analytical results from at least 10 percent of the samples are checked back to the sample preparation and analytical bench sheets. If no problems are found with the data package, the review will be considered complete.

If any problems are found with the data package, an additional 10 percent of the sample results will be checked back to the sample preparatory and analytical bench sheets. This cycle will then be repeated either until no errors are found in the checked data set or until all data has been checked. All errors and corrections noted will be documented.

9.1.2.3 Level 3: Administrative Quality Assurance Data Review

The Laboratory QA Manager will review 10 percent of all data packages. This review should be similar to the review as provided in Level 2 except that it will provide a total overview of the data package to ensure its consistency and compliance with project requirements. All errors noted will be corrected and documented.

9.1.3 Data Reporting

This section details the requirements for data reporting and data package formats that will be provided by the laboratory.

9.1.3.1 Hard Copy Deliverables

All relevant raw data and documentation, including (but not limited to) logbooks, data sheets, electronic files, and final reports, will be maintained by the laboratory for at least 10 years. The laboratory will notify Shaw 30 days before disposal of any relevant laboratory records.

Shaw will maintain copies of all COC Forms until receipt of the laboratory report. Laboratory reports will be logged in upon receipt and filed in chronological order. If necessary based on project DQOs, the second copy of the report will be sent for third-party data validation.

The data deliverable requirements for this project will be standard laboratory package with quality control summary.

9.1.3.2 Electronic Deliverables

The electronic data deliverable (EDD) will be in ASCII format. The analytical laboratory will follow the requirements stated in the Laboratory Interface Document for the Analytical Laboratory EDD. At project closeout, Shaw will submit a Navy Electronic Data Transfer System compatible electronic file to the Navy.

The laboratory will certify that the EDD and the hard copy reports are identical. Both the EDD and the hard copy will present results to two or three significant figures. For inorganic results, two significant figures will be used for results that are less than 10, and three significant figures will be used for results that are greater than 10. For organic results, one significant figure will be used for results that are less than 10, and two significant figures will be used for results that are greater than 10. The EDD for each SDG will be due at the same time as the hard copy; 14 days after sample delivery to the laboratory.

Field information (*e.g.,* date and time collected, sample identification, etc.) will be entered directly into the main database from the COC Form or uploaded from electronic files generated in the field.

Upon receipt by the Shaw Management System Data Manager, electronic data will be uploaded into a temporary Access database. The uploaded data will be printed and proofread relative to the hard copy submitted by the laboratory. The reader will also check for irregularities in analyte identities, concentrations, and units. The uploaded data will also be processed to compare the fields against a list of required values. If any errors are returned by the program, the file will be manually edited or regenerated by the laboratory. If no errors are returned, the data will be uploaded into the main database. The laboratory database will be merged with the field database, and reports will be generated from the merged database.

9.2 Data Validation

All soil and groundwater investigation samples will be validated by an independent data validation company. The data will be validated at 90 percent EPA Level III and 10 percent EPA Level IV according to the requirements of SWDiv Environmental Work Instruction 3EN2.1 (SWDiv, 2001). Samples collected for waste characterization and concrete chips will be reviewed by a Shaw Project Chemist (see Section 9.3). The validation will be in accordance with the EPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA, 2002), EPA *Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA, 1996), and the QC criteria specified in this document. Data will be validated and flagged with the following data qualifiers:

- *J qualifier* denotes the analyte was positively identified, but the associated numerical value is estimated.
- *U qualifier* denotes the analyte was analyzed for, but not detected. The associated numerical value is at or below the reporting limit.
- *R qualifier* denotes the data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

9.3 Data Review

The Project Chemist will review the laboratory data packages for waste samples to establish that holding times for extraction and analysis, and internal QC check requirements have been met and to establish data usability.

10.0 Quality Assurance Oversight

The QA oversight for this project will include system audits of field activities and of the laboratory subcontracted by the Navy to perform the analysis.

10.1 Laboratory Assessment and Oversight

Systems and performance audits will be carried out by Shaw as independent assessments of sample collection and analysis procedures. The systems audit is a qualitative review of the overall sampling or measurement system, while the performance audit is a quantitative assessment of a measurement system.

Audit results are used to evaluate if the analytical laboratories are able to produce data that fulfill the objectives established for the program and identify any areas requiring corrective action.

10.1.1 Naval Facilities Engineering Service Center Laboratory Audits

The laboratories will successfully complete a NFESC laboratory audit. A NFESC audit conducted in the past for a different project is an acceptable qualification.

10.1.2 Technical Systems Audits

A technical systems audit is an on-site, qualitative review of the sampling or analytical system to ensure that the activity is being performed in compliance with the SAP specifications, and that the collected data fulfill the project DQOs.

Laboratories performing under this program may be required to have a pre-qualification (or periodic) systems audit performed by Shaw, depending on the scope of services to be provided, past performance, or other factors indicating a need to evaluate quality in this manner. Subsequently, the laboratories will respond to and address any project or technical concerns resulting from the audits. A follow-up audit may be performed to verify resolution of findings and observations, as well as review the corrective measures taken. Laboratories found deficient will not be used on a project until the deficiencies are corrected and the laboratory accepted. Laboratories previously qualified for the types of testing to be performed on the project, will not require pre-qualification. That is, if prequalification has been within the past year and the work performed has been acceptable.

The laboratory systems audit results will be used to review laboratory operations and to ensure that any outstanding corrective actions have been addressed. A laboratory systems audit will include the following critical areas:

- Sample custody procedures
- Calibration procedures and documentation
- Completeness of data forms, notebooks, and other reporting requirements
- Data review procedures
- Storage, filing, and record keeping procedures
- QC procedures and documentation
- Operating conditions of facilities and equipment
- Documentation of training and maintenance activities
- Systems and operations overview
- Security of laboratory automated systems

After the audit, a debriefing session will be held for all participants to discuss the preliminary audit results. The auditor will then complete the audit evaluation and submit to the Project Manager and the laboratory, an audit report including observations of the deficiencies and the necessary recommendations for corrective actions. Follow-up audits will be performed prior to completion of the project to ensure corrective actions have been taken.

10.1.3 Performance Evaluation Audits

Performance audits quantitatively assess the data produced by a measurement system. A performance audit involves submitting project-specific performance evaluation samples for analysis for each analytical method used in the project. The performance audit answers questions about whether the measurement system is operating within control limits and whether the data produced will meet the project DQOs. If there is a concern about the laboratory performance, or per the Navy request, Shaw will administer performance evaluation samples for the target analytes.

Review of performance evaluation results include the following elements:

- Correct identification and quantitation of the performance evaluation sample analytes

- Accurate and complete reporting of the results

- Measurement system operation within established acceptance limits for accuracy

The concentrations reported for the performance evaluation samples will be compared to the known or expected concentrations spiked in the samples. The percent recovery will be calculated and the results assessed according to the acceptance limits, which are based on inter-laboratory studies. If the accuracy criteria are not met, the cause of the discrepancy will be investigated, and a second performance, evaluation sample will be submitted. The performance evaluation sample results review will be documented in a report to the Project Manager.

10.1.3.1 Performance Evaluation Sample Programs

The off-site laboratory will participate in the EPA performance evaluation Water Supply and Water Pollution Studies programs or equivalent programs for state certifications. Satisfactory performance in these performance evaluation programs also demonstrates proficiency in methods used to analyze project samples. The laboratory will document the corrective actions to unacceptable performance evaluation results to demonstrate resolution of the problems.

10.1.3.2 Magnetic Tape Audits

Magnetic tape audits involve the examination of the electronic media used in the analytical laboratory to acquire, report, and store data. These audits are used to assess the authenticity of the data generated, and assess the implementation of good automated laboratory practices. Shaw may perform magnetic tape audits of the off-site laboratory when warranted by the project performance evaluation sample results, or by other circumstances.

10.2 Field Audits

The Shaw and the Navy QA Officers may schedule audits of field activities at any time to evaluate the execution of sample collection, identification, and control in the field. The audit will also include observations of COC procedures, field documentations, instrument calibrations, and field measurements.

Field documents and COC Forms will be reviewed to ensure that all entries are printed or written in indelible ink, dated, and signed.

Sampling operations will be reviewed and compared to this SAP and other applicable SOPs (IT, 2000b). The auditor will verify that the proper sample containers are used, the preservatives are added or are already present in the container, and the documentation of the sampling operation is adequate.

Field measurements will be reviewed by random spot-checking to determine that the instrument is within calibration, that the calibration is done at the appropriate frequency, and that the sensitivity range of the instrument is appropriate for the project.

Audit findings will be documented in a report to the Shaw Program QC Manager and the Project Manager. Corrective action will be implemented as necessary.

10.3 Sampling and Analysis Plan

When circumstances arise that impact the original project DQOs, such as a significant change in work scope, this SAP will be revised or amended according to the requirements of *Environmental Work Instruction 3EN2.2* (SWDiv, 2001b). The modification process will be based on EPA guidelines, and direction from the Navy and QA Officer.

11.0 References

ERM-West, 1995, *Parcel 66 Parcel Evaluation Plan.*

IT Corporation, 2000a, *Quality Control Program Plan for Environmental Remedial Actions,* Contract Number N62474-D-2076.

IT Corporation, 2000b, *IT Standard Quality Procedures and Standard Operating Procedures Manual*, August.

IT Corporation, 2000c, *RCRA Part B Permit Closure Subsurface Investigation Report Industrial Waste Treatment Plant #25*, Alameda Point, February.

IT Corporation, 2002, *Summary Report RCRA Part B Permit Subsurface Closure, IWTP #25.*

Naval Facilities Engineering Services Center, 1999, *Navy Installation Restoration Chemical Data Quality Manual.*

U.S. Environmental Protection Agency, 1983, *Methods for Chemical Analysis of Water and Wastes*, Washington D.C.

U.S. Environmental Protection Agency, 1996, *Test Methods for Evaluating Solid Waste, Physical Chemical Methods, SW-846*, September, Third Edition, Update III, Washington D.C.

U.S. Environmental Protection Agency, 2000, *Data Quality Objectives Process for Hazardous Waste Site Investigations, EPA QA/G-4HW.*

U.S. Environmental Protection Agency, 2001, *Requirements for Quality Assurance Projects Plans, EPA QA/R5*

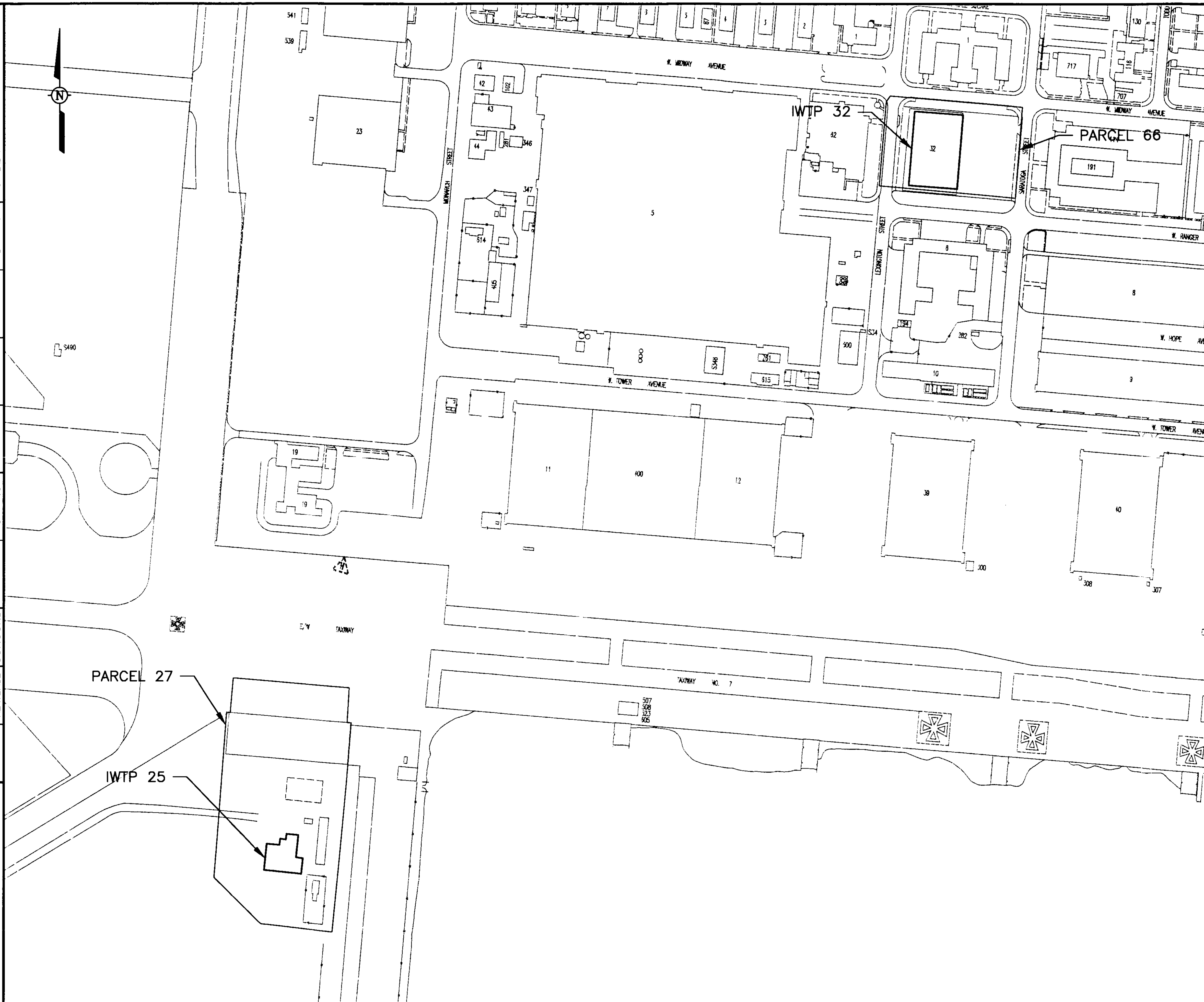
U.S. Environmental Protection Agency, 2002a, Region 9, *Preliminary Remedial Goals for Residential Soil*, October.

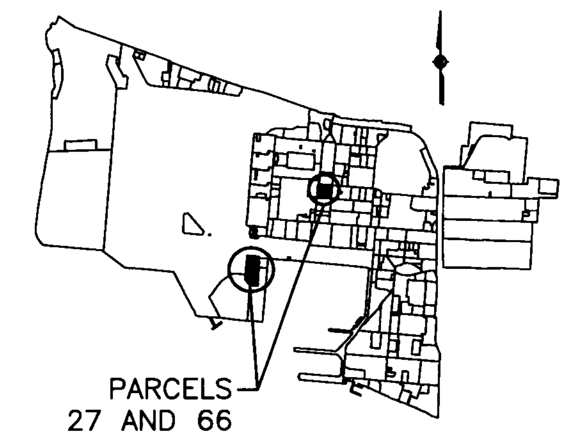
U.S. Navy Southwest Division, 2001a, *Environmental Work Instruction 3EN2.1 – Chemical Data Validation,* November.

U.S. Navy Southwest Division, 2001b, *Environmental Work Instruction 3EN2.2 – Review, Approval, Revision, and Amendment of Field Sampling Plans and Quality Assurance Project Plans,* November.

U.S. Navy Southwest Division, 2001c, *Environmental Work Instruction 3EN2.3 – Laboratory Quality Assurance Program,* November.

Figures





SCALE
0 300 600 FEET

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	ALA1BASE	CONCORD	B. JENSEN 12-4-03	SK 12-4-03	DS 12-4-03	807181-B128

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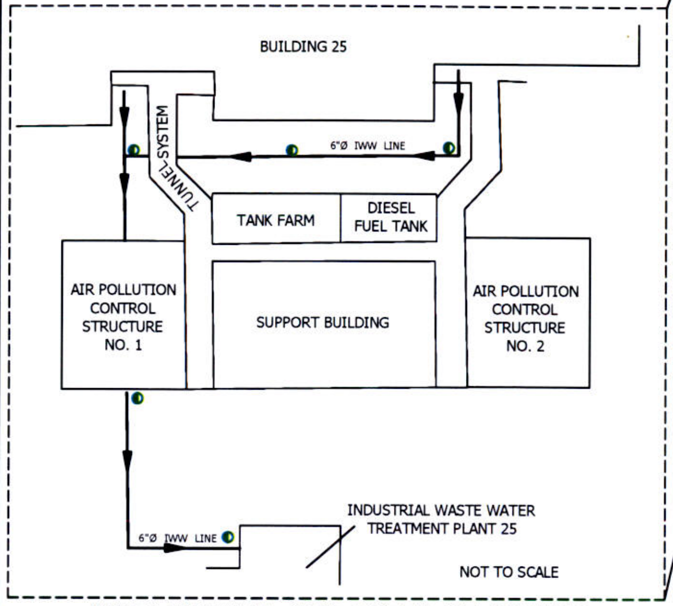
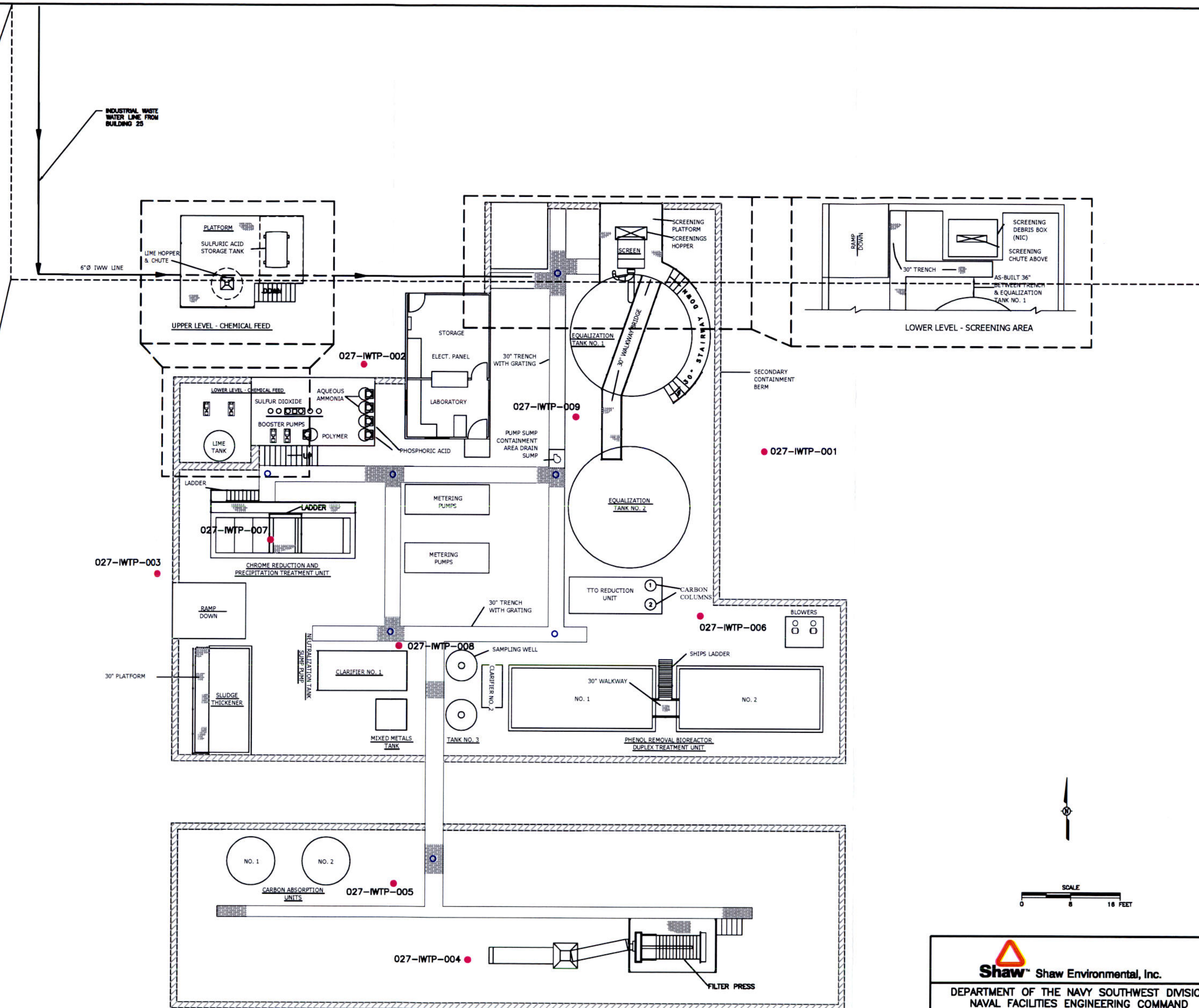
NAVAL FACILITIES ENGINEERING COMMAND
SOUTHWEST DIVISION
SAN DIEGO, CALIFORNIA

FIGURE 1

SITE LOCATION MAP
IWTPs 25 AND 32
ALAMEDA POINT
ALAMEDA, CALIFORNIA



INSET SHOWING AREA NORTH OF DRAWING



LEGEND

- ● PREVIOUS SOIL SAMPLE LOCATION (SEE NOTE 1)
- ● PROPOSED PIPELINE SOIL SAMPLE LOCATION
- ○ PROPOSED TRENCH LOCATIONS FOR SOIL/GROUNDWATER/CONCRETE CHIP SAMPLES (SEE NOTE 2)
- TRENCH WITH GRATING
- SECONDARY CONTAINMENT BERM
- IWW LINE (APPROXIMATE LOCATION BASED ON CONSTRUCTION DRAWINGS)
- The dash line shows an inset of top of the figure on this page and part of the figure on another page.

NOTES:

1. PREVIOUS SOIL SAMPLE LOCATIONS COMPLETED DURING RCRA PART B CLOSURE PERMIT SAMPLING BY IT CORP. 1999. THESE LOCATIONS WILL BE RESAMPLED FOR SOIL VOCs USING THE ENCORE® METHOD.
2. LOCATIONS OF 6 BACKGROUND CONCRETE CHIP SAMPLES WILL BE SELECTED DURING FIELD MOBILIZATION IN THE PRESENCE OF DTSC STAFF WITH THEIR CONCURRENCE.

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	CONCORD	SCHAEFFER 9/25/03	SK 12/1/03	DS 12/1/03	807181-D74

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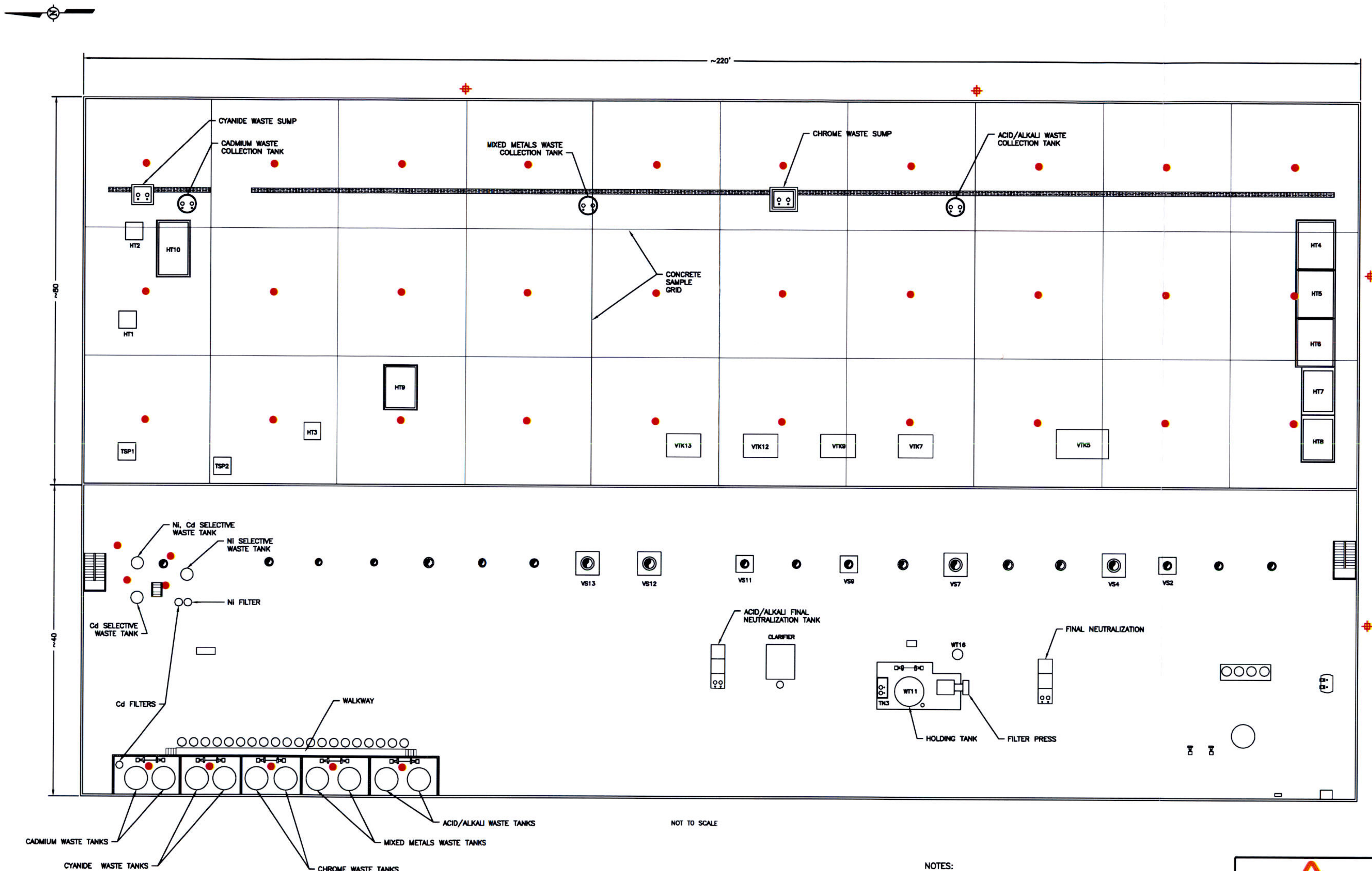
DEPARTMENT OF THE NAVY SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
SAN DIEGO, CALIFORNIA

FIGURE 2
SOIL, GROUNDWATER AND CONCRETE CHIP SAMPLE LOCATIONS
RCRA CORRECTIVE ACTIONS AT IWTP 25
ALAMEDA POINT
ALAMEDA, CALIFORNIA



LEGEND

- TRENCH WITH GRATING
- SECONDARY CONTAINMENT BERM
- CONCRETE CHIP SAMPLE LOCATION (SEE NOTES 1 AND 2)
- PROPOSED SOIL SAMPLE LOCATION
- VENT STACK
- SCRUBBER

NOTES:

1. LOCATIONS OF CONCRETE CHIP SAMPLES MAY CHANGE WITHIN THE GRID BASED ON FLOOR STAINING AND LOCATION OF EQUIPMENT.
2. BACKGROUND CONCRETE CHIP SAMPLES WILL BE COLLECTED FROM A VISUALLY CLEAN AREA ON THE FIRST FLOOR OF IWTP 32. THESE WILL BE LOCATED IN THE PRESENCE OF DTSC STAFF WITH THEIR CONCURRENCE.
3. APPROXIMATE GROUND FLOOR ELEVATION IS 114.0 FT. AND BASEMENT ELEVATION IS 110.0 FT. DATUM USED IS ALAMEDA NAS DATUM BM 54, EL. 116.98 FT. LOCATED AT CENTER LINE WEST END OF BUILDING 9.
4. APPROXIMATE DIRECTION OF GROUNDWATER FLOW BENEATH BUILDING 32 IS NORTH NORTHWEST.

Shaw Environmental, Inc.

DEPARTMENT OF THE NAVY SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
SAN DIEGO, CALIFORNIA

FIGURE 3

SOIL AND CONCRETE
CHIP SAMPLE LOCATIONS
RCRA CORRECTIVE ACTIONS AT IWTP 32
ALAMEDA POINT
ALAMEDA, CALIFORNIA

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
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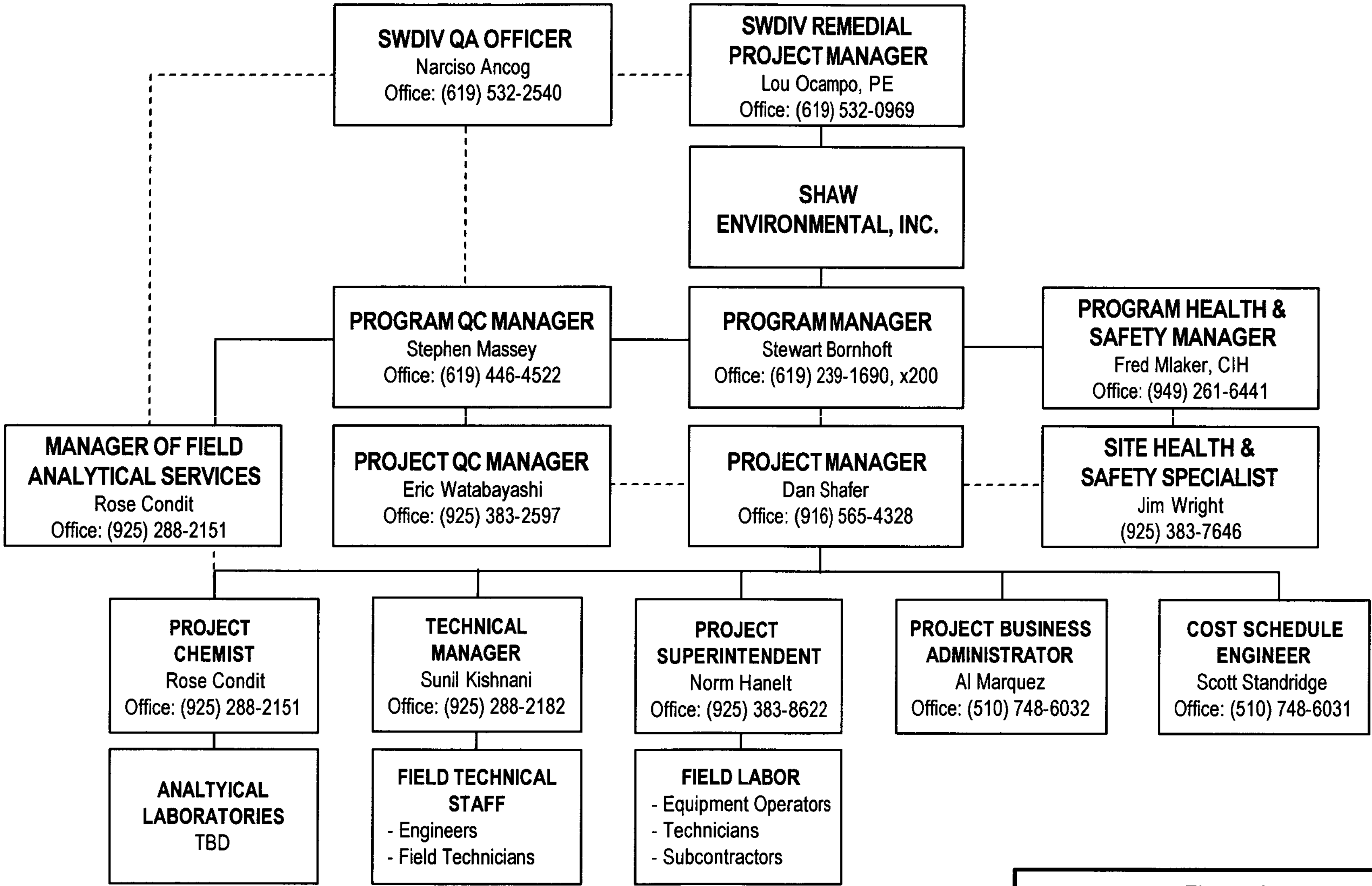

Figure 4
QC Organization Chart
IWTPs 25 & 32
CTO 0013

Shaw

Shaw Environmental and Infrastructure Inc.

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # 0001

Project Number:

Project Name / Location:

Purchase Order #:

Project Manager: (Name & phone #)

Shipment Date:

Send Report To:

Phone/Fax Number:

Address:

City:

Waybill Number:

Lab Destination:

Lab Contact Name / ph. #:

Sampler's Name(s):

Sample ID Number	Sample Description	Collection Information: Date	Time	Method	Matrix	# of containers	Container type	Preservative: HCL	NaOH	HNO_3	H_2SO_4	Ice		Analyses Requested: VOCs (8260B)	SVOC (EPA 8270C)	TPH as gasoline (EPA 8015B)	TPH as diesel (EPA 8015)	EDB (EPA 8011/504)	Metals (Full ICP and Hg) (6010B/7000)	PAH (EPA 8270-SIM/8310)	Hardness (EPA 130.1)	TDS (160.1)		
					GW		8 OZ Glass					X												
												X												

Special Instructions:

Turnaround Time:_________ ☐ 24-hr ☐ 48-hr ☐ Normal ☐ 3-day ☐ 5-day

Level Of QC Required: I II III Project Specific: ____________

Relinquished By:	Date: Time:	Received By:	Date: Time:
Relinquished By:	Date: Time:	Received By:	Date: Time:
Relinquished By:	Date: Time:	Received By:	Date: Time:

Method Codes

C = Composite G = Grab

Matrix Codes

DW = Drinking Water SO =Soil

GW = Ground Water SL = Sludge

WW = Waste Water CP = Chip Samples

Figure 5
Chain of Cusody

Tables

(General notes for tables follow Table 13)

Table 1
Project Personnel and Chemical Data Collection Responsibilities

Position	Responsibility
U.S. Navy QAO	• Reviews and approves Sampling and Analysis Plans (and Addendums) • Provides governmental oversight of the Shaw QA Program. • Provides quality-related directives through Contracting Officer's Technical Representative. • Provides technical and administrative oversight of Shaw surveillance audit activities. • Acts as point of contact for all matters concerning QA and the Navy's Laboratory QA Program. • Prepares governmental budget estimates for all QA functions included in Shaw contracts. • Coordinates training on matters pertaining to generation and maintenance of quality of data. • Authorized to suspend project execution if QA requirements are not adequately followed.
Program Chemist	• Reviews and approves the SAP. • Guides the selection of subcontract analytical laboratories. • Conducts field and laboratory audits. • Serves as a point of contact for the U.S. Navy QAO. • Develops corrective action as required. • Serves as a technical advisor to the project.
Project Chemist	• Develops the project data quality objectives and prepares the SAP. • Selects qualified subcontract laboratories. • Implements chemical data QC procedures and performs auditing of field performance. • Reviews laboratory data prior to use. • Coordinates data validation of laboratory data. • Reviews data validation report. • Prepares the appropriate sections of the report summarizing the project activities.
Field Technician	• Performs all sampling in accordance with approved SAP. • Ensures that field QC samples are collected as specified in this SAP. • Completes field documentation. • Coordinates laboratory and field sampling activities. • Implements field corrective actions as required.

Table 2
Comparison Criteria for Soil and Groundwater

Analyte Name	Reporting Limit, Soil, mg/kg	PRG Industrial Soil, mg/kg [1]	Reporting Limit, Water, µg/L	CA DHS MCL, µg/L [2]
Metals				
Arsenic	10	260	10	50
Cadmium	1.0	450	2.0	5.0
Chromium (total)	5.0	450	5.0	50
Copper	5.0	41000	5.0	1300
Iron	10	100000	100	No MCL
Lead	10	750	5.0	15
Mercury	0.2	310	0.2	2.0
Nickel	5.0	20000	5.0	100
Silver	5.0	5100	5.0	No MCL
Zinc	2.0	100000	5.0	No MCL
Hexavalent Chromium				
Hexavalent Chromium	1.0	64	10	No MCL
Cyanide				
Cyanide (total)	2.5	12,000	50	200
Volatile Organic Compounds				
Benzene	0.005	1.3	0.5	1.0
Bromobenzene	0.005	92	0.5	No MCL
Bromodichloromethane	0.005	1.8	0.5	No MCL
Bromoform	0.010	220	0.5	No MCL
Bromomethane	0.005	13	0.5	No MCL
n-Butylbenzene	0.005	240	0.5	No MCL
sec-Butylbenzene	0.005	220	0.5	No MCL
Bromochloromethane	0.005	No PRG	0.5	No MCL
tert-Butylbenzene	0.005	390	0.5	No MCL
Carbon Tetrachloride	0.005	0.55	0.5	0.5
Chlorobenzene	0.005	530	0.5	70
Dibromochloromethane	0.005	2.6	0.5	No MCL
Chloroethane	0.010	6.5	0.5	No MCL
Chloroform	0.005	2.0	0.5	No MCL
Chloromethane	0.010	2.6	0.5	No MCL
4-Chlorotoluene	0.005	560	0.5	No MCL

Table 2 (Continued)
Comparison Criteria for Soil and Groundwater

Analyte Name	Reporting Limit, Soil, mg/kg	PRG Industrial Soil, mg/kg [1]	Reporting Limit, Water, µg/L	CA DHS MCL, µg/L [2]
1,2-Dibromo-3-Chloropropane (DBCP)	0.005	0.046	0.5 [4]	0.2
1,2-Dibromoethane (EDB)	0.005	0.028	0.5 [4]	0.05
1,2-Dichlorobenzene	0.005	370	0.5	600
1,3-Dichlorobenzene	0.005	63	0.5	No MCL
1,4-Dichlorobenzene	0.005	7.9	0.5	5.0
Dichlorodifluoromethane	0.010	310	0.5	No MCL
1,1-Dichloroethane	0.005	6.0	0.5	5.0
1,2-Dichloroethane	0.005	0.60	0.5	0.5
1,1-Dichloroethene	0.005	410	0.5	6.0
cis-1,2-Dichloroethene	0.005	150	0.5	6.0
trans-1,2-Dichloroethene	0.005	230	0.5	10
1,2-Dichloropropane	0.005	0.74	0.5	5.0
1,3-Dichloropropene	0.005	1.8	0.5	0.5
Ethyl benzene	0.005	20	0.5	700
Hexachlorobutadiene	0.005	22	0.5	No MCL
Isopropylbenzene (Cumene)	0.005	2000	0.5	No MCL
Methylene Chloride	0.005	21	1.0	5.0
Methyl tertiary butyl ether (MTBE)	0.005	36 [3]	0.5	13
Naphthalene	0.005	190	0.5	No MCL
n-Propylbenzene	0.005	240	0.5	No MCL
Styrene	0.005	1700	0.5	100
1,1,1,2-Tetrachloroethane	0.005	7.3	0.5	No MCL
1,1,2,2-Tetrachloroethane	0.005	0.93	0.5	1.0
Tetrachloroethene	0.005	3.4	0.5	5.0
Toluene	0.005	520	0.5	150
1,2,4-Trichlorobenzene	0.005	3000	0.5	70
1,1,1-Trichloroethane	0.005	1200	0.5	200
1,1,2-Trichloroethane	0.005	1.6	0.5	5.0
Trichloroethene	0.005	0.11	0.5	5.0
Trichlorofluoromethane	0.005	2000	0.5	150

Table 2 (Continued)
Comparison Criteria for Soil and Groundwater

Analyte Name	Reporting Limit, Soil, mg/kg	PRG Industrial Soil, mg/kg [1]	Reporting Limit, Water, µg/L	CA DHS MCL, µg/L [2]
1,1,2-Trichloro-1,2,2-trifluoroethane	0.005	No PRG	5.0	1200
1,2,3-Trichloropropane	0.005	0.011	0.5	No MCL
1,2,4-Trimethylbenzene	0.005	170	0.5	No MCL
1,3,5-Trimethylbenzene	0.005	70	0.5	No MCL
Vinyl Chloride	0.010	0.75	0.5	0.5
Xylene (Total)	0.005	420	0.5	1750
Acetone	0.050	6000	100	No MCL
Carbon Disulfide	0.010	720	50	No MCL
2-Butanone (Methyl Ethyl Ketone)	0.050	27000	100	No MCL
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	0.050	2800	50	No MCL
2-Hexanone	0.050	No PRG	50	No MCL

[1] US EPA Region 9, Preliminary Remedial Goals for Soil, October 2002

[2] US EPA and California Department of Health Services, Maximum Contaminant Levels for Drinking Water Contaminants, November 2002

[3] California-modified PRG

[4] Reporting Limit for standard analytical method is higher than the PRG or MCL. Analyte is not expected to be present in sample, and usage of special analytical method is not feasible. Also, the MDL for the analyte is less than Reporting Limit and any possible detection above MDL will be reported by analytical laboratory.

MCL = Maximum Contaminant Level

mg/kg = milligrams per kilogram

µg/L =micrograms per liter

Table 3
Background Concentration in Shallow Groundwater and Soil
Alameda Point

Analyte	Sample Quantitation Limit	Frequency of Detection	Minimum Detected Concentration	Maximum Detected Concentration	Mean Concentration	95 UCL Concentration	80 LCL/95 Concentration
Shallow Groundwater, (µg/L)							
Aluminum	8.4-223	51/176	3	3970	32.12	96.2	439.13
Antimony	2-37.5	12/176	2.5	47.8	5.83	11.8	45.77
Arsenic	1.9-100	94/179	2	40.7	4.54	8	28.39
Barium	4.3-55.4	144/176	2.3	1260	34.06	123.3	574.73
Beryllium	0.1-3.7	18/176	0.94	3	0.49	1	3.83
Cadmium	0.2-8.0	16/176	0.32	6.5	0.53	1.3	5.38
Calcium	898-1370	176/180	620	513000	17865	78223	379269
Hexavalent Chromium-n[1]	100	1/3	4	4	34.7	100.6	NA
Chromium	0.6-32	23/176	0.74	82.8	1.54	3.4	13.79
Cobalt	2.3-17.2	6/176	2.5	10.5	3.5	4.6	11.57
Copper	0.4-69.7	54/176	2.1	27.3	3.97	7.5	27.48
Iron	4.8-363	119/180	7.2	24400	108.58	1624	7135
Lead	0.8-20	18/180	1.2	28.4	0.91	1.3	3.88
Manganese	1.1-12.3	172/180	1.1	2480	86.01	1171	5213
Mercury-n	0.1-0.29	3/180	0.2	0.3	0.1	0.1	0.15

Table 3 (Continued)
Background Concentration in Shallow Groundwater and Soil
Alameda Point

Analyte	Sample Quantitation Limit	Frequency of Detection	Minimum Detected Concentration	Maximum Detected Concentration	Mean Concentration	95 UCL Concentration	80 LCL/95 Concentration
Shallow Groundwater, (µg/L)							
Molybdenum	2.0-25.4	5/100	3.1	19.4	4.59	5.6	11.52
Nickel	1.7-49.1	13/180	2.7	151	5.6	7.4	19.06
Potassium	763-2340	175/180	1200	505000	14314	40552	182153
Selenium-n	1.9-54	1/180	2.5	2.5	1.58	1.9	5.97
Silver-n	0.4-5.4	2/170	2.4	4.8	1.48	1.6	3.33
Sodium	NA	180/180	4600	8160000	198988	937369	4539829
Thallium-n	1.7-76	3/175	3.6	5.2	2.21	2.3	5.8
Vanadium	1.4-19.5	69/180	2	50.8	4.97	8.4	28.65
Zinc	0.5-32.8	55/180	2.8	46800	4.87	10.5	42.91
Soil (mg/kg)							
Aluminum (b)	NA	55/55	1,760	22,600	5,231	6,528	12,930
Antimony (c)	0.46-11.0	18/55	0.7	8.6	2.2	2.7	5.7
Arsenic (b)	0.59-10	45/55	0.44	15.6	1.8	3.1	8.7
Barium (b)	NA	55/55	6.9	156	36.0	47.4	103
Beryllium (c)	0.15-1.0	28/55	0.25	1.47	0.50	0.60	1.2
Cadmium (b)	0.08-1.0	11/55	0.1	3.2	0.19	0.42	1.33
Calcium (b)	NA	55/55	816	66,600	2,913	4,686	12,513
Chromium (c)	NA	55/55	15.6	66.7	30.4	33.1	50.0

Table 3 (Continued)
Background Concentration in Shallow Groundwater and Soil
Alameda Point

Analyte	Sample Quantitation Limit	Frequency of Detection	Minimum Detected Concentration	Maximum Detected Concentration	Mean Concentration	95 UCL Concentration	80 LCL/95 Concentration
Cobalt (d)	3.96-5.7	48/55	3.0	49.7	6.1	7.9	19.3
Copper (b)	8.8-10.2	52/55	3.1	49.1	7.5	10.5	24.3
Iron (b)	NA	55/55	4,500	27,900	9,365	11,230	20,394
Lead (b)	1.9-3.0	51/55	0.47	165	4.1	9.9	32.6
Magnesium (b)	NA	55/55	1,290	8,800	2,627	3,172	5,969
Manganese (b)	NA	55/55	55.5	748	126.1	167.6	363.1
Mercury (b)	0.06-0.27	7/54	0.057	2.71	0.063	0.12	0.34
Nickel (b)	NA	55/55	11.5	80.4	25.8	30.1	49.7
Potassium (b)	NA	55/55	209	2,480	683	819	1,523
Silver (b)	0.18-1.47	11/55	0.32	5.6	0.30	0.58	1.73
Sodium (b)	NA	55/55	62.6	1,580	335.9	503.4	1,251
Titanium (e)	NA	1/1	518	518	518	NA	NA
Vanadium (c)	NA	55/55	10.5	55.3	22.6	25.1	44.6
Zinc (b)	18	54/55	10	191	22.6	29.2	61.5

Table 3 (Continued)
Background Concentration in Shallow Groundwater and Soil
Alameda Point

Notes:

95 UCL = 95 percent Upper Confidence Limit of the Mean Concentration

80 LCL/95 = 80th lower confidence limit on the 95th percentile of the distribution

CV = Coefficient of Variation

NA = not available

NC = not calculated

mg/kg = milligrams per kilogram

ug/kg = micrograms per kilogram

ug/L = microgram per liter

[1] The statistics for chemicals denoted with an "-n" are based on a normal distribution; too few detections were available to determine probability distribution.

Notes:

(a) Frequency of detection values are expressed as follows: number of samples in which chemical was detected/total number of samples for which chemical was analyzed.

(b) Data lognormally distributed; calculated 80 LCL/95 for natural logarithm-transformed data

(c) Data normally distributed

(d) Data not normally or lognormally distributed; calculated 80 LCL/95 from arithmetic mean and standard deviation

(e) Too few detections to determine distribution; calculated 80 LCL/95 from arithmetic mean and standard deviation

Table 4
IWTP 25 and 32 Tank Description and Analytical Waste Sampling Requirements

Tank	Construction	Sample Type and Analyses (If Necessary)
IWTP 25 – Permitted Units		
Chrome Reduction Tank (Flocculation Chamber)	Carbon Steel	Wipe Sample:
Chrome Reduction Tank (pH Adjustment Chamber)	Carbon Steel	-CCR Title 22 Metals (EPA 6010B/7000) -VOC (EPA Method 8260B)
Chrome Reduction Tank (O/W Separator Chamber)	Carbon Steel	
Chrome Reduction Tank (Chrome Reduction Chamber)	Carbon Steel	
Chrome Reduction Tank (Lower Chamber)	Carbon Steel	
Neutralization Units	Mild Steel	
Bioreactor No. 1	Fiberglass	
Bioreactor No. 2	Fiberglass	
Clarifier No. 1	Carbon Steel	
Clarifier No. 2	Carbon Steel	
Sampling Well	Carbon Steel	
Blue Tank No. 1 (TTO Reduction Unit)	Steel with Plastic Lining	
Blue Tank No. 2 (TTO Reduction Unit)	Steel with Plastic Lining	
Equalization Tank No. 1	Carbon Steel	
Equalization Tank No. 2	Carbon Steel	
Sludge Thickener Tank	Mild Steel	
Paint Screen w/ Hopper	Steel	
Calgon Carbon Unit 1	Carbon Steel	
Calgon Carbon Unit 2	Carbon Steel	
Filter Press	Steel	None

Table 4 (Continued)
IWTP 25 and 32 Tank Description and Analytical Waste Sampling Requirements

Tank		Construction	Sample Type and Analyses (If Necessary)
IWTP 25 - Non-Permitted Units			
Mixed Metals Tank		Carbon Steel	Wipe Sample: -CCR Title 22 Metals (EPA 6010B/7000) -VOC (EPA Method 8260B)
Tank No. 3		Fiberglass	
IWTP 32 – Permitted Units (Main Floor)			
CD-30	Cd filter	Stainless Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
CD-31	Ni filter	Stainless Steel	
FCD-1	Cd filter	Stainless Steel	
TSP-3	Ni waste tank	Steel	
TSP-4	Cd waste tank	Steel	
TSP-5	Ni & Cd waste tank	Steel	
WT-1	Cyanide waste tank	Fiberglass	Wipe for Cyanide (EPA 9010B/9012A)
WT-2	Cyanide waste tank	Fiberglass	Wipe for Cyanide (EPA 9010B/9012A)
WT-3	Cadmium waste tank	Fiberglass	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
WT-4	Cadmium waste tank	Fiberglass	
WT-5	Mixed Metals tank	Fiberglass	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
WT-6	Mixed Metals tank	Fiberglass	
WT-7	Chrome waste tank	Fiberglass	
WT-8	Chrome waste tank	Fiberglass	
WT-9	Acid/Alkali tank	Fiberglass	
WT-10	Acid/Alkali tank	Fiberglass	
WT-11	Holding tank (final neutralization)	Fiberglass	
TN-1	Acid/Alkali final neutralizing tank	Stainless Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
TN-2	Neutralizing tank (final neutralization)	Stainless Steel	
CLAR	Clarifier	Steel	
	Filter Press	Steel	None

Table 4 (Continued)
IWTP 25 and 32 Tank Description and Analytical Waste Sampling Requirements

Tank		Construction	Sample Type and Analyses (If Necessary)
IWTP 32 – Permitted Units (Basement)			
SUMP-5	Acid/Alkali waste collection tank	Stainless Steel	Wipe for: -CCR Title 22 Metals (EPA 6010B/7470)
Chrome waste sump (in-ground)		Concrete	Rinse water sample: -CCR Title 22 Metals (EPA 6010B/7470)
SUMP-2	Cadmium waste collection tank	Stainless Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
Cyanide waste sump (in-ground)		Concrete	Rinse water sample: -Cyanide (EPA 9010B/9012A)
SUMP-4	Mixed Metals collection tank	Stainless Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
IWTP 32 Non-Permitted Units (Main Floor)			
WT-16	Industrial Waste Tank	Al or SS	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
TN-3	Neutralization Tank	Stainless Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
IWTP 32 Non-Permitted Units (Basement)			
TSP-1	Cadmium Waste Tank	Carbon Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
TSP-2	Nickel Waste Tank	Carbon Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
HT-1	Spent Cyanide Plating Solution	Stainless Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470) -Cyanide (EPA 9010B/9012A)
HT-2	Spent Cyanide Plating Solution	Stainless Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470) -Cyanide (EPA 9010B/9012A)
HT-3	Spent Cadmium Plating Solution	Stainless Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
HT-4	Spent Acid/Alkali & Mixed Metals Plating Solution	Stainless Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)

Table 4 (Continued)
IWTP 25 and 32 Tank Description and Analytical Waste Sampling Requirements

Tank		Construction	Sample Type and Analyses (If Necessary)
HT-5	Spent Cadmium, Chromium, and Mixed Metals Plating Solution	Stainless Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
HT-6	Spent Chromium & Acid/Alkali Plating Solution	Stainless Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
HT-7	Spent Acid/Alkali & Mixed Metals Plating Solution	Poly	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
HT-8	Spent Chromium & Acid/Alkali Plating Solution	Poly	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
HT-9	Spent Acid/Alkali & Mixed Metals Plating Solution	Poly	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
HT-10	Spent Cyanide Plating Solution	Stainless Steel	Wipe for -CCR Title 22 Metals (EPA 6010B/7470) -Cyanide (EPA 9010B/9012A)
VTK-5	Mixed Metals Waste Tank	PVC	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
VTK-7	Chrome Waste Tank	Carbon Steel w/ poly coating	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
VTK-9	Acid/Alkaline Waste Tank	Carbon Steel w/ poly coating	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
VTK-12	Chrome Waste Tank	Carbon Steel w/ poly coating	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)
VTK-13	Chrome Waste Tank	Carbon Steel w/ poly coating	Wipe for -CCR Title 22 Metals (EPA 6010B/7470)

Table 5
Summary of Field Sampling and Analysis

Location	Number of Field Samples	Number of QC Samples	Analysis	Description
IWTP 25				
Soil Sampling	12 – previous sample locations	1 MS/MSDs	VOC (EPA 5035/8260B)	Re-sample for VOCs at nine locations sampled during the RCRA Part B Permit Closure Activities conducted in 1999. Previous locations identified in Section 3.1 and shown on Figure 2.
	10 - pipeline		VOC (EPA 5035/8260B) Metals (EPA 6010B/7000) Hexavalent Chromium (EPA 7196A)	Five locations along the pipeline that runs between the boiler room (outside of Bldg 25) and IWTP 25 (see Figure 2). Two soil sample will be collected from each location adjacent to the pipeline 1 and 3 feet from the bottom of the pipe.
	14 - trenches	1 MS/MSDs		Seven locations along the concrete trenches located inside IWTP 25 (see Figure 2). Two soil samples will be collected from each location at approximately 0.5 - 1 and 4 – 4.5 feet bgs.
Groundwater Sampling	12	2 Field duplicates 1 MS/MSD (if enough volume is produced) Trip blank	VOC (EPA 8260B) Dissolved metals (EPA 6010B/7000)Hexavalent Chromium (EPA 7196A)	Groundwater samples will be collected from the same sample locations as soil for the pipeline and concrete trenches, using direct-push drilling technique Note: The temporary groundwater sampling locations may not produce enough water to collect MS/MSD samples.
Concrete Chip Sampling	7 - Trenches 6 - Background	None	Metals (EPA 6010B/7000) Hexavalent Chromium (EPA 7196A/7199)	Seven locations within the shallow concrete trenches. One concrete chip sample collected from each location by chipping the surface with a hammer and chisel (or equivalent)
Wipe/Rinsate Samples	As necessary	None	Specific per tank contents see Table 4.	As necessary to achieve cost-effective disposal. Samples will only be collected if necessary and at the direction of the T&D coordinator.

Table 5 (Continued)
Summary of Field Sampling and Analysis

Location	Number of Field Samples	Number of QC Samples	Analysis	Description
IWTP 32				
Soil Samples	12 (estimated)	1 MS/MSD	VOC (EPA 5035/8260B) Metals (EPA 6010B/7000) Cyanide (EPA 9010B/9012A) Hexavalent Chromium (EPA 7196A/7199)	Up to 3 soil samples will be collected from four boring locations placed on the southern and eastern perimeter of Building 32. Samples will be collected at approximately 0 – 0.5 feet bgs, 4 – 4.5 feet bgs and at the soil/groundwater interface. Exact sample depths will be determined in the field depending on the depth to groundwater at each location.
Concrete Chip Sampling	Up to 30 (basement) 9 - Main Floor 6 - Background	None	Metals (EPA 6010B/7000) Cyanide (EPA 9010B/9012A) Hexavalent Chromium (EPA 7196A/7199)	Stained areas will be overlaid with a 25' x 25' sampling grid. One concrete chip sample collected from each grid by chipping the surface with a hammer and chisel (or equivalent)
Concrete Sumps (Rinsewater)	1 – chromium waste sump 1 – cyanide waste sump	None	Chromium (EPA 6010B) Cyanide (EPA 9010B/9012A)	Two concrete sumps, chrome waste and cyanide waste, were observed to contain liquid during recent inspection. The sumps will be pumped out and cleaned prior to "in-place" closure. After cleaning, a sample of the final rinsewater will be collected.
Wipe/Rinsate Samples	As necessary	None	Specific per tank contents see Table 4.	As necessary to achieve cost-effective disposal. Samples will only be collected if necessary at the direction of the T&D coordinator.

Table 5 (Continued)
Summary of Field Sampling and Analysis

Location	Number of Field Samples	Number of QC Samples	Analysis	Description
Investigation-Derived Waste Disposal Profile				
Waste Water	2 (estimated)	None	VOCs (EPA Method 624/8260B) TPH as gas (EPA Method 8015B) TPH as diesel/motor oil (EPA Method 8015B) Total Metals (arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel, silver, and zinc EPA Methods 200.7/245.1/ 6010B/7470 SVOCs (EPA Method 625/8270C) Phenolic Compounds (EPA Method 420.2) Cyanide (EPA Method 335.2) O&G (EPA Method 1664) HEM with SGC pH (Field Measurement) Temperature (Field Measurement)	Sampling as need to dispose of wastewater accumulated during demolition activities. Analysis shown are based on existing permits for POTW discharge requirements, and may change at the request of the disposal facility or the T&D Coordinator.
Investigation-Derived Waste Disposal Profile (Continued)				
Resin Waste	1 (estimated)	None	CCR Title 22 Metals (EPA 6010B/7000) Cyanide (EPA 9010B/9012A)	Resin removed from IWTP basement floor

Table 6
Sample Containers, Preservatives, and Holding Times

Analytes	Method	Container(a)	Preservative	Holding Time
		Soil		
Metals	EPA 6010B/7470	4 or 8 ounce glass jar with Teflon®-lined lid	Cool at 4±2°C	180 days for all metals except mercury 28 days for mercury
Hexavalent Chromium	EPA 7196A	4 ounce glass jar with Teflon®-lined lid	Cool at 4±2°C	28 day to digestion 24 hours after digestion
TPH as diesel and motor oil	EPA 8015B	4 or 8 ounce glass jar with Teflon®-lined lid	Cool at 4±2°C	14 days for extraction and 40 days for analysis
TPH as gasoline	EPA 5035/8015B	2 EnCore® devices or equivalent	Cool at 4±2°C	48 hours for unpreserved 14 days for preserved
SVOC	EPA 8270C	4 or 8 ounce glass jar with Teflon®-lined lid	Cool at 4±2°C	14 days for extraction and 40 days for analysis
VOCs	EPA 5035/8260B	3 En Core® devices or equivalent	Cool at 4±2°C	48 hours for unpreserved 14 days for preserved
Cyanide	EPA 9010B/9012A	4 or 8 ounce glass jar with Teflon®-lined lid	Cool at 4±2°C	14 days
		Water		
TPH as diesel and motor oil	EPA 8015B	One 1-liter amber bottles, Teflon™-lined lid	Cool at 4±2°C	7 days before extraction, 40 days after extraction
TPH as gasoline and jet fuel	EPA 8015B	Three 40-mL vials, Teflon™-lined septum	HCl to pH<2 Cool at 4±2°C	14 days
VOCs	EPA 624/8260B	Three 40-mL vials, Teflon™-lined septum	HCl to pH<2 Cool at 4±2°C	14 days
Metals	EPA 6010B/7470A (200.7/245.1)	500-mL HDPE	HNO_3 to pH<2	180 days for all metals except mercury 28 days for mercury
Cyanide	EPA 335.2/9010B/9012A	One 1-liter HDPE	Cool at 4±2°C NaOH to pH 12	7 days before extraction, 40 days after extraction
Phenolic Compounds	EPA 420.1	One 1-liter amber bottle Teflon™-lined lid	Cool at 4±2°C	7 days
SVOC	EPA 625/8270C	One 1-liter amber bottle, Teflon™-lined lid	Cool at 4±2°C H_2SO_4 to pH <2	7 days before extraction, 40 days after extraction
Oil and Grease	EPA 1664 HEM with Silica Gel Cleanup	One 1-liter amber bottle, Teflon™-lined lid	Cool at 4±2°C H_2SO_4 to pH <2	28 days

Table 6 (Continued)
Sample Containers, Preservatives, and Holding Times

Analytes	Method	Container[a]	Preservative	Holding Time
		Water		
Hexavalent Chromium	EPA 7196A/7199	1-500 mL HDPE	Cool at 4±2°C	24 Hours
		Wipe		
Metals (not including mercury)	EPA 6010B	1- wipe, glass jar with Teflon®-lined lid	Cool at 4±2°C	180 days for all metals except mercury
Mercury	EPA 7470A	1- wipe, glass jar with Teflon®-lined lid	Cool at 4±2°C	28 days for mercury
Cyanide	EPA 9010/9012A	1- wipe, glass jar with Teflon®-lined lid	Cool at 4±2°C	28 day to digestion 24 hours after digestion
SVOC	EPA 8270C	1- wipe glass jar with Teflon®-lined lid	Cool at 4±2°C	14 days for extraction and 40 days for analysis
VOCs	EPA 8260B	1- wipe glass jar with Teflon®-lined lid	Cool at 4±2°C	14 days for preserved

(a) Additional sample containers will be provided for MS/MSD analyses.

Table 7
Summary of QC Requirements and Corrective Action for Chromatography Methods

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Five-point initial calibration for target analytes	Initial calibration prior to sample analysis	Target analyte CF or RF RSD less than or equal to 20%[1] Mean CF or RF RSD less than or equal to 20%[1]	Correct problem, then repeat initial calibration.
Second-source calibration verification	Once per five-point initial calibration	Less than 20% difference for most target analytes, 25% for difficult compounds	Correct problem, then repeat initial calibration.
Daily calibration verification	Before sample analysis and every 10 samples or every 12 hours, as specified by the method	Less than 15% difference for all target analytes	Correct problem, then repeat initial calibration.
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Re-calculate results; locate and fix the problem, if exists, re-run demonstration of those analytes that did not meet acceptance criteria.
Retention time window study	Establish initially, verify during daily calibrations	Within ±3 standard deviations of each analyte retention time from the initial study.	Correct problem, re-evaluate analyte identification.
8081A: DDT and Endrin breakdown check	Daily prior to analysis of samples and every 24 hours	Degradation ≤15%	Clean the system, repeat breakdown check.
Internal standards (optional)	Every sample, spiked sample, standard, and method blank	Laboratory established QC acceptance criteria	Correct problem, re-extract and re-analyze affected samples.
Method blank	One per analytical batch (VOCs) and one per preparation batch (SVOCs)	No analytes detected above the RL	Correct problem, then re-extract and re-analyze method blank and all samples processed with the contaminated blank.
MS/MSD	One MS/MSD pair conducted on Navy samples per each analytical/preparation batch	Laboratory statistically derived control limits or Advisory recovery limits: 70-130%	Identify problem. If not related to matrix interference, re-extract and re-analyze MS/MSD and all associated batch samples.
LCS or LCS/LCD pair if there is not enough sample for MS/MSD	One LCS or LCS/LCD pair per analytical/preparation batch	Laboratory statistically derived control limits or Advisory recovery limits: 70-130%	Correct problem, then re-extract and re-analyze the LCS and all associated batch samples.

Table 7 (Continued)
Summary of QC Requirements and Corrective Action for Chromatography Methods

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Surrogate standards	Every sample, spiked sample, standard, and method blank	Laboratory statistically derived control limits or Advisory recovery limits: 70-130%	Correct problem, then re-extract and re-analyze all affected samples.
MDL study	Once per 12-month period	Detection limits established will be below the RLs	Correct problem, repeat the MDL study.

CF denotes Calibration Factor.

DDT denotes Dichlorodiphenyltrichloroethane.

RF denotes Response Factor.

RSD denotes Relative Standard Deviation.

[1] If RSD for any analyte is > 20%, regression fit may be used for the calibration curve for that analyte. Acceptance criteria for first order regression is a correlation coefficient $r \geq 0.99$.

Table 8
Summary of QC Requirements and Corrective Action for EPA Methods 8260B and 8270C

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Five-point initial calibration for target analytes.	Initial calibration prior to sample analysis	8260B: The minimum average SPCC RF for Chloromethane and 1,1 Dichloroethane and Bromoform is 0.1; for Chlorobenzene and 1,1,2,2-Tetrachloroethane is 0.30. 8270C: The minimum average SPCC RF is 0.050. 8260B and 8270C: RSD average is less than or equal to 15% for target analytes, and is less than or equal to 30% for CCC[1]	Correct problem, then repeat initial calibration.
Second-source calibration verification	Once per five-point initial calibration	Less than 25% difference for all target analytes and CCCs	Correct problem, then repeat initial calibration.
Daily calibration verification	Before sample analysis and every 12 hours of analysis time	Less than 20% difference for CCCs and specific target analytes Less than 30% difference for all other analytes Minimum RF for SPCCs per method specifications	Correct problem, then repeat initial calibration.
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Re-calculate results; locate and fix the problem, if exists, re-run demonstration of those analytes that did not meet acceptance criteria.
Check of mass spectral ion intensities (tuning procedure) using BFB (8260B) and DFTPP (8270C)	Prior to initial calibration and calibration verification	Must meet the method's requirements before samples are analyzed	Re-tune instrument and verify the tune acceptability.
Internal Standards	During data acquisition of calibration standard, samples and QC check samples	Areas within -50% to +100% of last calibration verification (12 hours) for each	Inspect mass spectrometer and GC for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning.
Method blank	One per analytical batch (8260B) and one per preparation batch (8270C)	No analytes detected above the RL	Correct problem, then re-extract and re-analyze method blank and all samples processed with the contaminated blank.

Table 8 (Continued)
Summary of QC Requirements and Corrective Action for EPA Methods 8260B and 8270C

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
MS/MSD	One MS/MSD pair conducted on Navy samples per analytical/preparation batch	Laboratory statistically established control limits; advisory recovery limits: accuracy - 70-130% precision – 30%	Identify problem. If not related to matrix interference, re-extract and re-analyze MS/MSD and all associated batch samples.
LCS or LCS/LCD pair if there is not enough sample for MS/MSD	One LCS or LCS/LCD per analytical/preparation batch	Laboratory statistically established control limits; advisory recovery limits: accuracy - 70-130% precision – 30%	Correct problem, then re-extract and re-analyze the LCS (LCS/LCD) and all associated batch samples.
Surrogate standards	Every sample, spiked sample, standard, and method blank	Advisory QC acceptance criteria per method specification or laboratory statistically established limits	Correct problem, then re-extract and re-analyze all affected samples.
MDL study	For each analytical system: once per 12-month period and after every major repair	Detection limits established will be at least two times below the RLs	Correct problem, repeat the MDL study.

[1] *If RSD for any analyte is >15%, regression fit should be used for the calibration curve for that analyte. Acceptance criteria for first order regression is a correlation coefficient $r \geq 0.99$.*

Table 9
Summary of QC Requirements and Corrective Action for EPA Method 6010B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Initial calibration (IC) per manufacturer's instructions with a minimum of three standard and a calibration blank	Initial calibration prior to sample analysis	Accepted if the initial calibration verification (ICV) passes	Correct problem, repeat initial calibration.
Second-source ICV, prepared at the calibration mid-point	Once per initial calibration	Less than 10% difference from IC for all target analytes	Correct problem, repeat initial calibration.
Continuing calibration verification (CCV), same source as IC	Following IC, after every 10 samples and the end of the sequence	Less than 10% difference from IC for all target analytes; ≤5% RSD for a minimum of two integrations	Correct problem, repeat initial calibration.
Calibration Blank	After IC, before CCV calibration, after every 10 samples, and at the end of the sequence	All target analytes are within three times the IDL	Prepare and analyze the blank again, re-calibrate the instrument.
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Re-calculate results; locate and fix the problem, if exists, re-run demonstration of those analytes that did not meet acceptance criteria.
IDL study	Once per 12 month period	IDL will be below the RL	Correct problem, repeat the IDL study.
MDL study (water only)	Once per 12 month period	MDL will be below the RL	Correct problem, repeat the MDL study.
Method blank	One per digestion batch	No analytes detected above the RL	Correct problem, then prepare and analyze again the method blank and all samples processed with the contaminated blank.
Interference check solution (ICS)	At the beginning of an analytical run	Within ±20% of expected value	Terminate analysis; correct problem; reanalyze ICS; reanalyze all affected samples.
MS/MSD for all analytes	One MS/MSD pair conducted on Navy samples per each preparation batch	QC acceptance criteria: Laboratory statistically derived limits or 75-125% accuracy, 20% precision	Identify problem, re-prepare and re-analyze the MS/MSD pair and all samples in the associated batch.
LCS or LCS/LCD pair if there is not enough sample for MS/MSD	One LCS or LCS/LCD pair per each preparation batch	QC acceptance criteria: 75-125% accuracy, 20% precision	Terminate analysis, identify and correct the problem, prepare and analyze all affected samples and QC checks again.

Table 9 (Continued)
Summary of QC Requirements and Corrective Action for EPA Method 6010B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Dilution test	Each new sample matrix	1:5 dilution must agree within ±10% of the original determination	Perform post digestion spike addition.
Method of standard addition (MSA), single or multi-level	When interferences are suspected or and for new sample matrix	Linearity of a multi-level MSA	Correct problem, repeat MSA.
Post digestion spike addition	When dilution test fails	Recovery within 75-125% of expected results	Correct problem, reanalyze post digestion spike addition.

RSD = Relative Standard Deviation

MDL = Method Detection Limit

MSA = Method of Standard Additions

Table 10
Summary of Calibration Requirements, Quality Control Procedures, and Corrective Action for EPA Method 7000A, Conducted per the Test Methods for Evaluating Solid Waste (SW-846), Update III

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Initial multi-point calibration with a minimum of three standards and a calibration blank	Initial calibration prior to sample analysis	Correlation coefficient > 0.995; accepted if the ICV passes	Correct problem, repeat initial calibration.
Second-source ICV, prepared at the calibration mid-point	Once per initial calibration	Less than 10% difference from IC for all target analytes	Correct problem, repeat initial calibration.
CCV, same source as IC	After every 10 samples and at the end of the sequence	Less than 20% difference from IC for all target analytes	Correct problem, re-analyze previous 10 samples.
Calibration Blank	After IC, before CCV calibration, after every 10 samples, and at the end of the sequence	All target analytes not detected above the PQLs	Prepare and analyze the blank again, re-calibrate the instrument.
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Re-calculate results; locate and fix the problem, if exists, re-run demonstration of those analytes that did not meet acceptance criteria.
MDL study (water only)	Once per 12 month period	MDLs will be below the PQLs	Correct problem, repeat the MDL study.
Method blank	One per digestion batch	No analytes detected above the PQLs	Correct problem, then prepare and analyze again the method blank and all samples processed with the contaminated blank.
MS/MSD for all analytes	One MS/MSD pair conducted on Navy samples per each preparation batch	QC acceptance criteria: 80% to 120% accuracy, 20% precision	Identify problem. If not related to matrix interference, re-extract and re-analyze MS/MSD and all associated batch samples.
LCS or LCS/LCD pair if there is not enough sample for MS/MSD	One LCS or LCS/LCD pair per each preparation batch	QC acceptance criteria: 80% to 120% accuracy, 20% precision	Correct problem, re-digest and re-analyze LCS/LCD pair and the affected batch.
Dilution test	One sample per batch	1:5 dilution must agree within ±10% of the original determination	Perform post digestion spike addition.
Post digestion spike addition (recovery test)	When dilution test fails	Recovery within 85% to 115% of expected results	Conduct MSA test.
MSA, single or multi-level	When post-digestion spike addition fails	Linearity of a multi-level MSA	Correct problem, repeat MSA.

Table 11
Summary of Quality Control Requirements and Corrective Action for Inorganic Analyses

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Initial three-point calibration and a blank	Initial calibration prior to sample analysis	Correlation coefficient >0.99	Correct problem, repeat initial calibration
Second-source ICV, prepared at the calibration mid-point	Once per initial calibration	Per method's requirements or laboratory established criteria	Correct problem, repeat initial calibration
CCV, same source as IC	After every 10 samples and at the end of the sequence	Per method's requirements or laboratory established criteria	Correct problem, re-analyze previous 10 samples
Calibration Blank	After IC, before CCV calibration, after every 10 samples, and at the end of the sequence	All target analytes not detected above the RL	Prepare and analyze the blank again, re-calibrate the instrument.
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyzes of a QC check sample	Once	QC acceptance criteria per method's requirements	Re-calculate results; locate and fix the problem, if exists, re-run demonstration of those analytes that did not meet acceptance criteria
MDL study (water only)	Once per 12 month period	MDL will be below the RL	Correct problem, repeat the MDL study
Method blank	One per preparation batch	No analytes detected above the RL	Correct problem, then prepare and analyze again the method blank and all samples processed with the contaminated blank
MS for all analytes	One MS conducted on Navy samples per each preparation batch	Advisory recovery limits 70-130%	Identify problem. If not related to matrix interference, re-extract and re-analyze MS/MSD and all associated batch samples.
SD or MS/MSD pair	One SD or MS/MSD pair conducted on Navy samples per each preparation batch	30% RPD for soil, 20% RPD for water Advisory recovery limits 70-130%	Identify problem. If not related to matrix interference, re-extract and re-analyze MS/MSD or SD and all associated batch samples.
LCS or LCS/LCD pair if there is not enough sample for MS/MSD or SD	One LCS or LCS/LCD pair per each preparation batch	30% RPD for soil, 20% RPD for water Advisory recovery limits 70-130%	Correct problem, re-prepare and re-analyze LCS/LCD and the affected batch

Table 12
Gas Chromatography/Mass Spectrometry Data Deliverables Package Requirements

Method	Deliverable Requirement	Equivalent EPA Form	CLP or CLP-like Package, Level IV	SW-846 Package, Level III	Standard Laboratory Report
Organic Analysis by GC/MS	Case Narrative		X	X	X
	Corrective Action Report(s)		X	X	X
	Cross-reference of field sample numbers, laboratory IDs, and analytical QC batches		X	X	X
	Chain-of-Custody Form, Cooler Receipt Form		X	X	X
	Sample log-in sheet	DC-1	X		
	Complete SDG file inventory sheet	DC-2-1	X		
	Data summary for each blank and sample[1]	I	X	X	X
	TICs for each sample (ten peaks)	I, TIC	X		
	LCS/LCD report (including concentration spiked, percent recovered, percent recovery acceptance limits, RPD, and RPD acceptance limits)	III (modified)	X	X	X
	Surrogate recovery report (including concentration spiked, percent recovered, and percent recovery acceptance limits)	II	X	X	X
	MS/MSD report (including concentration spiked, percent recovered, percent recovery acceptance limits, RPD, and RPD acceptance limits)	III	X	X	X
	Instrument performance check (tuning) report	V	X	X	
	Initial calibration data (including acceptance limits)	VI	X	X (summary only)	
	Continuing calibration data (including acceptance limits)	VII	X	X (summary only)	
	Internal standard areas and retention time reports (including acceptance limits and out-of-control flags)	VIII	X	X	
	Reconstructed ion chromatogram for each sample and rerun, blank, spike, duplicate, and standard		X		
	Instrument quantitation report		X		
	Raw and background subtracted mass spectra for each target analyte found		X		
	Mass spectra of TICs with library spectra of five best-fit matches		X		
	Sample preparation bench sheets		X	X	
	Gel permeation chromatography clean-up logs		X		
	Method blank summary	IV	X		
	Standard preparation logs		X	X	
	Analysis run logs	VIII	X	X	
	Percent moisture		X	X	X
	pH		X[2]		

Table 13
Metals Data Deliverables Package Requirements

Method	Deliverable Requirement	Equivalent EPA Form	CLP or CLP-like Package, Level IV	SW-846 Package, Level III	Standard Laboratory Report
Metals Analysis	Case Narrative		X	X	X
	Corrective Action Report(s)		X	X	X
	Cross-reference of field sample numbers, laboratory IDs, and analytical QC batches		X	X	X
	Chain-of-Custody Form, Cooler Receipt Form		X	X	X
	Sample log-in sheet	DC-1	X		
	Complete SDG file inventory sheet	DC-2-1	X		
	Data summary for each blank and sample[1]	I-IN	X	X	X
	LCS/LCD report (including concentration spiked, percent recovered, percent recovery acceptance limits, RPD, and RPD acceptance limits)	VII-IN	X	X	X
	MS/MSD report (including concentration spiked, percent recovered, percent recovery acceptance limits, RPD, and RPD acceptance limits)	V (Part 1)-IN	X	X	X
	Post-digestion spike recovery	V (Part 2)-IN	X	X	X
	Duplicate sample report	VI-IN	X	X	X
	Blank results	III-IN	X	X	X
	Initial and continuing calibration data	II (Part I)-IN	X	X	
	ICP interference check sample report	IV-IN	X	X	
	Standard addition results	VIII-IN	X	X	
	ICP serial dilution results	IX-IN	X		
	Preparation logs	XIII-IN	X	X	
	Analysis run logs	XIV-IN	X	X	
	Standard preparation logs		X	X	
	Contract required detection limit standard report	II (Part 2)-IN	X		
	Instrument detection limits	X-IN	X		
	ICP inter-element correction factors	XI-IN	X	X	
	Data and instrument printouts		X		
	Percent moisture		X	X	X
	pH		X[2]		

General Notes to Tables:

°C denotes degrees Celsius.
µg/kg denotes microgram per kilogram.
µg/L denotes microgram per liter.
CCC denotes Calibration Check Compound.
CCR denotes California Code of Regulations.
CCV denotes continuing calibration verification.
CF denotes Calibration Factor.
CLP denotes Contract Laboratory Protocol.
DDT denotes dichlorodiphenyltrichloroethane.
DFTPP denotes decafluorotriphenylphosphine.
Dioxins denote polychlorodibenzo-p-dioxins.
EPA denotes U.S. Environmental Protection Agency.
ft denotes feet.
Furans denote polychlorodibenzofurans.
GC denotes gas chromatography.
GC/FID denotes gas chromatography/flame ionization detector.
GC/MS denotes gas chromatograph/mass spectrometer.
HDPE denotes high-density polyethylene
IC denotes initial calibration.
ICP denotes inductively coupled plasma.
ICS denotes interference check solution.
ICV denotes initial calibration verification.
ID denotes identification.
IDL denotes instrument detection limit.
IT denotes IT Corporation.
LCD denotes laboratory control duplicate.
LCS denotes laboratory control sample.
MDL denotes method detection limit.
mg/kg denotes milligram per kilogram.
mg/L denotes milligram per liter.
mL denotes milliliter.
MS denotes matrix spike.
MS/MSD denotes matrix spike/matrix spike duplicate.
MSA denotes method of standard addition.
NA denotes not applicable.
PCB denotes polychlorinated biphenyl.
PQL denotes practical quantitation limit.
PRG denotes preliminary remediation goal.
QA denotes quality assurance.
QAO denotes Quality Assurance Officer.
QC denotes quality control.
RF denotes Response Factor.
RL denotes reporting limit.
RPD denotes relative percent difference.
RSD denotes Relative Standard Deviation.
SAP denotes Sampling and Analysis Plan.
SD denotes sample duplicate.
SDG denotes sample delivery group.
SPCC denotes System Performance Check Compound.
STLC denotes Soluble Threshold Limit Concentrations.
SVOC denotes semivolatile organic compound.
TCLP denotes Toxicity Characteristic Leaching Procedure.
TIC denotes tentatively identified compound.
TPH denotes total petroleum hydrocarbon.
TTO denotes total toxic organic.
VOC denotes volatile organic compound.
WET denotes Waste Extraction Test.

Appendix B
Site Health and Safety Plan

FINAL

SITE HEALTH AND SAFETY PLAN
RCRA Corrective Actions at IWTPs 25 and 32
Alameda Point
Alameda, California

Environmental Remedial Action
Contract Number N62474-98-D-2076
Contract Task Order 0013

Document Control Number 7031
Revision 0

December 8, 2003

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Shaw Project Manager

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Shaw Program Certified Industrial Hygienist

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Acronyms and Abbreviations

AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
Cal/OSHA	California Occupational Safety and Health Administration
CIH	Certified Industrial Hygienist
CPR	cardiopulmonary resuscitation
CRC	contaminant reduction corridor
CRZ	contamination reduction zone
EZ	exclusion zone
IWTP	Industrial Waste Treatment Plant
IT	IT Corporation
LBP	lead based paint
MSDS	material safety data sheet
PHSP	Program Health and Safety Plan
PPE	personal protective equipment
PS	Project Superintendent
RCRA	Resource Conservation and Recovery Act
SHSP	Site Health and Safety Plan
SHSS	Site Health and Safety Specialist
SZ	support zone

Policy Statement

Shaw Environmental, Inc. maintains a policy of providing a safe and healthful work environment for all employees and subcontractors. No phase of operations or administration is afforded greater importance than injury and illness prevention. Safety shall take precedence over expediency or shortcuts, and all reasonable precautions shall be taken to reduce the possibility of injuries, illnesses, or accidents.

This Site Health and Safety Plan (SHSP), in conjunction with the *Shaw Program Health and Safety Plan for Environmental Remedial Actions, Contract Number N62474-98-D-2076,* (IT, 2000) describes the procedures that Shaw will follow during project operations. Operational changes that could affect the health or safety of personnel, the community, or the environment will not be made without the prior approval of the Shaw Program Certified Industrial Hygienist. The provisions of this SHSP are mandatory for all Shaw personnel, Shaw Project Managers, and Shaw subcontractor personnel.

Objective

The objective of this SHSP is to provide the guidelines for the contract task orders issued under contract with the Department of the Navy, Engineering Field Activity–West. The procedures and guidelines contained herein are based on the best information available at the time of the plan's preparation. This SHSP describes the specific health and safety requirements and procedures that Shaw will use while conducting fieldwork.

An SHSP is developed for each contract task order. In combination with the Program Health and Safety Plan (IT, 2000), and Shaw's Health and Safety Policies and Procedures (Shaw, 2003), and Safety and Health Requirements Manual, EM-385-1-1, U.S. Army of Engineers, September 1996, the SHSP serves as the Code of Safe Work Practices. Each of these documents are required to be on site and available for immediate reference. Collectively, they contain the essential elements of each project site's Health and Safety program. Section 1.0 of this SHSP describes the project site and the scope of work.

Changes to the SHSP must be approved by the Health and Safety Officer, Health and Safety Manager, and the Project Manager or Project Superintendent and recorded on the Site-Specific Health and Safety Plan Amendment Form (see Attachment A). The Navy Technical Representative may acknowledge the change but is not required to sign the form. The Project Health and Safety Manager will forward a copy of the SHSP Change Approval Form to the Contracting Officer.

Site Health and Safety Plan Acknowledgment

I understand and agree to abide by the provisions detailed in the Program Health and Safety Plan and this Site Health and Safety Plan for the activities described in the project Work Plans. I understand that failure to comply with these provisions may lead to disciplinary action, which may include dismissal from the work site, termination of employment, or, for subcontractors, termination of the work contract.

Printed Name	Company	Signature	Date

1.0 Site Description and Scope of Work

1.1 Industrial Waste Treatment Plant No. 25

Industrial Waste Treatment Plant (IWTP) 25 is located in Building 25A on Parcel 27 in the southern central section of Alameda Point. IWTP 25 provided waste treatment for paint and coating waste streams from Building 25, Naval Aviation Depot Corrosion Control Facility, which housed paints stripping and corrosion control operations. Operation of processes within Building 25 were terminated before base closure in 1997. Operations continued at IWTP 25 until 1999, treating fluid waste from base closure and cleanup activities.

Constructed in 1987, Building 25 is a 54,500 square foot steel warehouse-style structure. The floor of Building 25 contains six concrete work bays. Each work bay was used to perform one of three corrosion prevention processes including plastic media git stripping, chemical stripping, and washing. A trench system collected rinsate from the work bays and transported it to Building 25A located south of Building 25. A review of the processes, previous investigations, and reported incident releases indicated the waste compounds treated at IWTP 25 to include phosphoric acid, sulfuric acid, methylene chloride, phenols, halogenated and non-halogenated organics, metals (chromium, mercury, and lead).

1.2 Industrial Waste Treatment Plant No. 32

IWTP 32 is located in Parcel 66, in the central section of Alameda Point. IWTP 32 occupies the western half of Building 32 which was specifically designed to house plating shop operations and waste processing operations. Containment barriers in the structure were designed to prevent uncontrolled releases of chemicals to the environment. Other activities that occurred inside Building 32 included electric drying in ovens, welding, ion vapor deposition, chrome anodizing and plating, degreasing, abrasive blasting, chromium/magnesium/aluminum finishing, cadmium conversion coating, and acid etching and stripping. These processes typically involved the use or generation of chemicals and waste including mixed metals, cyanide waste, cadmium waste, chromium, acids, alkalis, chrome waste, and nickel precipitates. In addition, metal degreasers, including volatile organic compounds, sodium salts, corrosives, and lubricants, have been stored in Building 32 since its construction. Waste process chemicals were treated and then discharged into the sanitary sewer.

1.3 Scope of Work

The objectives of this project, which is expected to last for approximately six months, are summarized as follows:

- In accordance with the Work Plan, all permitted and non-permitted RCRA waste tanks and associated waste conveyance piping at IWTPs 25 and 32 will be removed for recycling or disposal as appropriate. The concrete foundations of tanks and other structures will be left in place. The scrubbers and the vent stacks at IWTP 32 will be left in place. Some of the waste tanks in the basement of IWTP 32 will be rendered useless (by methods described in the Work Plan) to achieve closure. The sumps in the basement of IWTP 32 will be closed-in-place;
- After completion of dismantling and demolition activities, the work areas will be restored to their original condition as far as practical;
- Soil and groundwater will be sampled beneath IWTP 25 to assess the release of contamination;
- Concrete chip samples will be collected from the floors of IWTPs 25 and 32; and
- Soil and groundwater samples will be collected from the vicinity of the waste transfer pipeline from Building 25 to IWTP 25.

2.0 Responsibilities

Project personnel are responsible for their own health and safety, for completing tasks in a safe manner, and for reporting any unsafe acts or conditions to their supervisor and the Project Superintendent (PS). All persons on site are responsible for continuous adherence to health and safety procedures during the performance of any project work. In no case may work be performed in a manner that conflicts with the intent of, or the inherent safety precautions expressed in this Site Health and Safety Plan (SHSP). After due warning, persons who violate procedures or work rules may be dismissed from the site, be terminated, or have their contract revoked. Blatant disregard or repeated infractions of health and safety policies are grounds for disciplinary action up to, and including, dismissal and/or removal from the project.

All Shaw and subcontractor personnel are required to read and acknowledge their understanding of this SHSP. All project personnel are expected to abide by the requirements of this SHSP and to cooperate with project management and safety representatives to ensure a safe and healthful work site. Site personnel are required to immediately report any of the following to the PS:

- Accidents and injuries, no matter how minor
- Expected or uncontrolled release of chemical substances
- Any sign or symptoms of chemical exposure
- Any unsafe or malfunctioning equipment
- Any changes in site conditions that may affect the health and safety of project personnel

Key project personnel are identified in Attachment C, "Emergency Phone Numbers" of this SHSP.

3.0 Project Hazard Analysis

3.1 Activity Hazard Analysis

The various planned remedial actions are listed below. Corresponding activity hazard analyses (AHA) are presented in Attachment D: Prior to beginning each day's activities, these AHAs will be reviewed and revised to address hazards posed by changed conditions or new activities. The contents of the AHAs will be communicated to the affected workers at the daily tailgate safety meetings.

- Asbestos Survey/Removal of Bulk Friable ACM
- Cap and Seal Inlets to Piping
- Confined Space Entry
- Consolidate Construction Debris
- Debris Removal
- Demolition of Above Ground Storage Tank and Associated Piping
- Demolition of Structures and Buildings
- Disposal of Construction Debris
- Equipment Decontamination
- Facility Decontamination
- Facility Demolition
- Fuel Line Removal/Disposal
- Hand Auger Operations
- Pressure Washing
- Lead Based Paint Abatement
- Overhead/Belowgrad Piping Decontamination
- Overhead Utility
- Pipeline Tapping, Removal, and Disposal
- Steamline Removal (Asbestos Removal)
- Tank Removal and Cleaning
- Underground Utility Lines
- Utility Clearance/Surveying
- Product Removal and Vacuum Exraction Testing

3.2 Chemical Contaminants of Concern

The waste tanks and associated waste conveyance piping to be removed have been thoroughly cleaned and rinsed. There remains only a possibility of residual rinsate in the piping systems to be demolished.

A limited amount of abatement of lead based paint (LBP) will be required at Building 25. There is a potential for workers who perform the abatement to be exposed to lead dust. Table 1, "Chemical Properties and Exposure Limits," identifies the properties and occupational exposure limits for lead.

3.3 Lead Compliance Plan

A preliminary lead compliance plan for LBP removal is given in Attachment F. It will be revised when the abatement subcontractor submits a site-specific LBP abatement plan.

3.4 Confined Spaces

Confined space entry might be required if tank inspections indicate that additional cleaning is needed. If confined space entry becomes necessary, a supplementary activity hazard analysis will be written and Shaw confined space procedure HS300 will be followed.

4.0 Personal Protective Equipment

The appropriate initial level of personal protective equipment (PPE) -- either Level D, modified level D, or Level C - is specified on the appended activity hazard analyses. These protection levels are described below.

Level D denotes the following, at a minimum:

- Standard work uniform or coveralls
- Steel-toed work boots, ANSI-approved (steel-toed "athletic style" shoes are not permitted on site)
- Cotton or leather gloves
- Safety glasses with side shields, ANSI-approved
- Hearing protection (if necessary) providing 25 dBA or greater protection
- Splash shield (if necessary)

Modified Level D denotes the following, at a minimum:

- Standard work uniform or coveralls
- Steel-toed work boots, ANSI-approved (steel-toed "athletic style" shoes are not permitted on site)
- Steel-toed polyvinyl chloride boots-if liquids encountered, ANSI-approved (may be constructed of other materials as appropriate)
- Tyvek, or equivalent, coveralls
- Leather-palmed gloves
- Latex or Nitrile gloves (inner)–if liquids encountered
- Nitrile gloves (outer)–if liquids encountered (may be constructed of other materials as appropriate)
- (Hearing protection (if necessary) providing 25 dBA or greater protection
- Hard-hat, ANSI-approved
- Safety glasses with side shields, ANSI-approved. Use face shield if splash potential is significant.

Level C denotes the following, at a minimum:

- Half-face or full-face APR with National Institute for Occupational Safety and Health/Mine Safety and Health Administration-approved cartridges (full-face is required if eye irritation is encountered)
- Cartridges approved for protection against dusts fumes, and mist.
- Steel-toed polyvinyl choride boots-if liquids encountered, ANSI approved
- Tyvek (or equivalent) coveralls with hoods and elastic wrists and ankles
- Latex or Nitrile gloves (inner) – if liquids encountered
- Nitrile* gloves (outer)-if liquids encountered
- Hearing protection (if necessary) with 25 dBA or greater protection
- Hard-hat, ANSI-approved
- Safety glasses with side shields, ANSI-approved, if full-face APR is not worn
- Splash shield (if necessary) if full-faced APR is not worn. Must be worn with ANSI-approved safety glasses.

4.1 Personal Protective Equipment Upgrade/Downgrade

As site activities progress, levels of PPE are subject to change or modification. PPE may be upgraded when action levels are exceeded or whenever the need arises to protect the safety and health of site personnel. PPE level upgrades or downgrades are customarily communicated between the Program Certified Industrial Hygienist (CIH) and the Site Health and Safety Officer and are based on the results of air sampling data. Levels of PPE will not be downgraded without prior approval from the Program CIH.

No work requiring Level B PPE will be permitted without the authorization and concurrence of the Program CIH. No work requiring Level A will be permitted without the authorization and concurrence of the Program CIH and the Vice President of Health and Safety.

4.2 Respirator Cartridge Changeout Schedule

Should Level C PPE become necessary, a respirator cartridge changeout schedule will be determined based on air monitoring data, the chemicals of concern, and the cartridge service life program supplied by the cartridge manufacturer. At a minimum, respirator cartridges will be changed at the end of each shift or when a contaminant warning property, such as odor or irritation, is detected inside the respirator.

5.0 Site Control

Work zones will be set up as presented on Attachment E. A general description of work zones is given below.

5.1 Work Zones

To prevent migration of contamination caused through tracking by personnel or equipment, work areas and PPE are clearly specified prior to beginning operations. Each site will be set up separately, taking into consideration the working space, the type of contamination, and the activities to be performed. This access control may require fences, barricades, traffic control devices, use of flaggers, caution tape, and other means to keep the site secure and to provide a visual barrier to help keep the curious or the public from entering the site. For sites requiring modified Level D or higher, the work area will be divided into three work zones based on the exposure to contaminated materials or anticipated hazards associated with the work: an exclusion zone (EZ), a contamination reduction zone (CRZ), and a support zone (SZ).

5.1.1 Exclusion Zone

The interiors of each building will be designated as the exclusion zones. The EZ perimeter may be indicated with barricade tape, and signage to restrict entry to the area to those individuals with the proper training, medical certification, and PPE.

5.1.2 Contamination Reduction Zone

The CRZ, or transition zone, will be established just outside of the doorways of each building. In the CRZ, personnel will begin the sequential decontamination process required to exit the EZ. To prevent off-site migration of contamination and for personnel accountability, all personnel will enter and exit the EZ through a corridor in the CRZ. The corridor between these two zones is called the contaminant reduction corridor (CRC). The zones will be delineated with yellow barricade tape.

In the CRC, both personnel and equipment decontamination will be performed if contamination occurs. Personnel decontamination will require removal of PPE and hand washing. Tools and materials used in this area will be moved to a station set up for that purpose. Some tools and materials may be disposable, in which case they will be placed in the container set up in the CRC.

5.1.3 Support Zone

The SZ will be outside of the buildings, where the support equipment and sanitation facilities (i.e., toilets, drinking and washing water) are staged. Smoking, drinking, and eating will be allowed only in designated areas in the SZ. An emergency eye wash will be staged in this area.

5.2 Hazard Briefing

No person will be allowed on the site during site operations without first being given a site hazard briefing. In general, the briefing will consist of a review of the SHSP and the tailgate safety meeting. All persons on the site, including visitors, must sign the SHSP Acknowledgement Sheet (page vii of this SHSP) and the tailgate safety meeting form. The tailgate safety meetings will be held daily before site activities begin.

5.3 Access Controls

The Health and Safety Officer and the PS will establish the physical boundaries of each zone and shall instruct all workers and visitors on the limits of the restricted areas. No one will be allowed to enter the restricted area without the required protective equipment for that area. The PS will ensure compliance with all restricted area entry and exit procedures.

The PS shall also designate a decontamination point for personnel to exit from the contaminated area and to enter into the clean area where personnel may rest and drink.

5.4 Visitor Access

Only authorized visitors will be allowed access to the EZ. Visitors requiring access to the exclusion zone will be escorted by Shawpersonnel and will be required to do the following:

- Submit proof of current hazardous waste operations training pursuant to 8CCR 5192 (e)
- Submit documentation of a medical certification pursuant to 8CCR 5192 (f)
- Use the protective equipment designated for the site

Access to exclusion zones will be denied if any one of these conditions is not met.

6.0 Decontamination

See Section 7.0 of the Program Health and Safety Plan (PHSP) for decontamination procedures for project personnel and equipment. Additional site-specific decontamination procedures are given below.

6.1 Personnel Hygiene and Decontamination Facilities and Procedures

Portable toilet(s), hand wash, and other standard personnel hygiene facilities will be provided during the project. Employees will be encouraged to wash hands frequently throughout the day and before eating, drinking, or smoking.

6.2 Equipment Decontamination Facilities and Procedures

Specific requirements for equipment decontamination facilities for this project are detailed in the PHSP.

7.0 Site Monitoring

This section details the monitoring requirements for airborne contaminants and physical hazards.

7.1 Air Monitoring

Personal air monitoring is essential to ensure that all field personnel are adequately protected from airborne contaminants. The action levels specified in Table 2, "Action Levels," have been established based on contaminants of concern, the potential routes of entry, duration of exposure, and the permissible exposure levels established by the California Division of Occupational Safety and Health, and the immediately dangerous to life or health levels established by the National Institute for Occupational Safety and Health.

7.1.1 Real-Time Air Monitoring Frequency and Location

Requirements for real-time air monitoring for each activity are detailed in the activity hazard analyses given in Attachment D.

7.1.2 Integrated Personal Exposure Monitoring

Integrated breathing zone air sampling including collection on mixed cellulose ester filters and analysis by atomic absorption spectroscopy will be conducted during LBP abatement activities.

7.2 Monitoring of Physical Hazards

The Site Health and Safety Specialist (SHSS) may monitor physical hazards such as noise or temperature, under the direction of the Program CIH. The specific requirements for monitoring noise and evaluating heat and cold stress are discussed in detail in the PHSP as well as in the Shaw Health and Safety Policies and Procedures Manual.

8.0 Employee Training

This section details the training requirements for personnel who will be performing field work or who will otherwise be involved in on-site activities.

8.1 Tailgate Safety Meetings

Prior to the start of the project, all personnel will participate in an initial tailgate safety meeting. During the initial tailgate safety meeting, the PHSP and this SHSP will be discussed. The PS will ensure that the anticipated site hazards are summarized and explained to all personnel and that those personnel are aware of the precautions they must take to minimize their exposure to the hazards. Tailgate safety meetings will be held at the start of each work shift. All new employees will be required to attend a Site Health and Safety orientation. Attendance records and meeting notes will be maintained with the project file.

8.2 Lead Training

Demolition workers who may be exposed to airborne lead in excess of the Cal/OSHA action level will be trained pursuant to 8 CCR 1532.1(l).

8.3 Hazardous Waste Training

All personnel entering the EZ or CRZ of the soil remediation areas will have completed at least 40 hours of hazardous waste operations training with annual refreshers, and supervisors will have had an additional 8-hour supervisory training as required by Title 8, California Code of Regulations, Section 5192 (e). Additional job or function specific training requirements are specified in the appended activity hazard analyses.

8.4 Confined Space Training

If confined space entry becomes necessary, all involved personnel will be trained pursuant to Shaw Procedure HS 300.

8.5 Hazard Communication

All personnel performing field activities will receive basic hazard communication training, which involves a review of the Shaw written hazard communication program (Shaw Health and Safety Procedure HS 060), MSDSs for chemicals used on site, container labeling, and chemical health hazards. MSDSs will be obtained for all materials purchased or brought on site that require an MSDS, and the MSDS will be kept on site with this SHSP.

8.6 Site-Specific Training

Site-specific training will be accomplished through an initial review of this SHSP by the SHSS and through the daily tailgate safety meetings. Attendance for such training will be tracked by obtaining signatures of all attendees and will be documented in the project files.

8.7 First Aid and Cardiopulmonary Resuscitation

At least two employees current and certified in first aid and cardiopulmonary resuscitation (CPR) will be assigned to the project, and at least one of these will be on the site whenever operations are ongoing. Where multiple work groups are dispersed throughout a project site, more than two employees will be current and certified in first aid and CPR. The extent of coverage will be determined relative to the number of employee groups. First-aid trained personnel will also be trained in bloodborne pathogen hazards. Shaw requires refresher training in first aid and CPR for such individuals to maintain a current certificate. The SHSS will be current and certified in first aid and CPR training.

9.0 Medical Surveillance Program

Shaw uses the services of Health Resources for medical surveillance requirements for all projects. All Shaw personnel and Shaw subcontractors working on site within the CRZ or EZ are required to have completed an occupational medical examination within the last 12 months as specified by 8CCR 5192(f). Such individuals are also required to have written clearance in their record to work on hazardous waste sites and to wear a respirator if required by the job.

10.0 Emergency Response Plan and Contingency Procedures

Site personnel must be prepared to respond and act quickly in the event of an emergency. Emergency preparedness and response procedures will aid in protecting site workers and the surrounding environment. Preplanning measures will include employee training, fire and explosion prevention and protection, chemical spill and discharge prevention and protection, and safe work practices to avoid personal injury or exposure. These items will be discussed in the daily tailgate safety meetings.

10.1 Project Superintendent

At all times during scheduled work activities, a designated PS will be present on the site. This individual is responsible for implementing any emergency response or contingency procedures. Depending upon the circumstances, and time permitting, the PS will review proposed response actions with the SHSS.

10.2 Site Health and Safety Specialist

The SHSS is responsible for implementing, communicating, and enforcing health and safety policies and procedures during the course of the project. The SHSS will also assist in the evaluation of health and safety concerns with respect to environmental releases and emergency response actions. In the event of an injury, the Concord Health and Safety Administrator must be notified of the medical incident and report it to the Continuum Healthcare Case Manager.

10.3 List of Emergency Contacts and Notification

The PS and SHSS will be notified immediately in the event of an emergency. The PS will immediately evaluate the incident and, if necessary, notify the fire department and other emergency contacts listed in Attachment C.

10.4 Fire Control

In the event of a fire or explosion, or imminent danger of fire or explosion, all activities will halt, and the fire department listed in Attachment C will be notified immediately. If it is safe to do so, site personnel may use fire-fighting equipment available on site to remove and isolate flammable or other hazardous materials, which may contribute to the fire.

The following measures will be implemented during site activities to minimize the risk of fire and/or explosion:

- Smoking will be prohibited on site except in designated smoking areas.
- Good housekeeping procedures will be required on site.

- Material storage methods will comply with manufacturers' recommendations.
- Flammable liquids will be stored in approved containers only.
- All storage, handling, or use of flammable and combustible materials will be conducted by trained personnel only.
- Entry and exit pathways will be kept clear of debris or obstacles.
- Work areas will be cleared of excess vegetation and obstructions.
- Hot Work Permits will be required on site.

10.5 Site Evacuation Procedures

Prior to field activities, the PS will determine emergency egress routes and discuss them with all personnel who will be conducting fieldwork. Initial planning includes establishing emergency warning signals and evacuation routes in case of an emergency. The site route map to the hospital is contained in Attachment B. The initial evacuation muster points and EZs are shown on the Exclusion Zone and Muster Point Location Map contained in Attachment E. Usually these areas are located upwind of project areas. As work progresses, the Health and Safety Officer may alter these assembly areas depending on site and weather conditions. The site-specific evacuation procedures will be discussed in detail at the daily safety tailgate meeting.

The authority to order personnel to evacuate the work area rests with the PS and the SHSS. In the event that site evacuation is required, a continuous, uninterrupted air horn or vehicle horn (back up) will be sounded for approximately 10 seconds. Personnel working in the EZ will immediately make their way to the muster point for a head count.

The EZ, evacuation route, and emergency equipment locations have been included on a map and are located in Attachment E of this document. This map will be posted at each entrance to the EZ. During an emergency, the evacuation routes noted on this map should be followed. If conditions such as wind direction or physical hazards do not allow access to the prescribed evacuation routes, evacuate by the safest route available.

10.6 Spills or Leaks

Shaw will maintain the following equipment and materials in the CRZ for use during spill response activities:

- Absorbent pads
- Granular absorbent material
- Polyethylene sheeting
- 55-gallon drums
- Shovels and assorted hand tools

10.7 Medical Emergency Response

In the event of severe physical or chemical injury, the fire department listed in Attachment C will be summoned for emergency medical treatment and ambulance service. Once an initial assessment is made by the emergency medical technicians, the decision to use ground or air transportation for the victims will be made. Minor injuries will be treated on site by qualified first aid providers; if additional treatment beyond first aid is required, the injured personnel will be transported to the designated hospital. Transportation routes and maps will be placed in each site vehicle before on-site activities begin. Maps from the sites to applicable hospitals are included in Attachment B.

10.8 Personal Exposure or Injury

The following general guidelines will be adhered to in the event of personal exposure to contaminants:

- ***Contact/Absorption***—Copious amounts of distilled or tap water will be used to flush contaminants from the skin for at least 20 minutes. Flushing will be started while removing contaminated clothing. If irritation persists, flushing will be repeated. The condition of the individual will be assessed, and transport to a medical center will be arranged if necessary. The victim shall not be transported unless the recommended flushing period has been completed or flushing can be continued during transport.
- ***Inhalation***—The victim will be moved immediately to an area providing fresh air. The victim will be decontaminated and provided artificial respiration f necessary. The condition of the individual will be assessed, and transport to a medical center will be arranged if necessary.
- ***Ingestion***—The local poison control center will be contacted immediately. The victim will be decontaminated, if necessary, and transported to a medical facility.

10.9 List of Emergency Contacts and Notifications

The SSHS will immediately evaluate the incident and, if necessary, notify emergency support services. If not previously notified, the PM and location contact will be advised of the situation. Telephone numbers for emergency personnel are listed in Attachment C. This list will be maintained with current contacts, and telephone lists will be kept along with other emergency phone numbers in each site vehicle.

The information provided to the notified person should include the nature of the incident and the exact location and suspected materials involved. Information regarding the incident that should be reported to the emergency operator includes the following:

- Name and telephone number of the individual reporting the incident
- Location and type of incident
- Nature of the incident (fire, explosion, spill, or release) and substances involved

- Number and nature of medical injuries
- Movement or direction of spill/vapor/smoke
- Response actions currently in progress
- Estimate of quantity of any released materials
- Status of incident
- Other pertinent information

11.0 References

IT Corporation, 2000, *Program Health and Safety Plan for Environmental Remediation Actions*, Contract No. N62474-98-D-2076, Revision No. 0, June.

National Institute for Occupational Safety and Health, *Pocket Guide to Chemical Hazards*, U.S. Department of Health and Human Services (DHHS) Publication No. 94-116, Current Edition.

Shaw Environmental, Inc., 2003, *Health and Safety Policies and Procedures*.

State of California, Department of Transportation, *Manual of Traffic Controls*, 1996, Revision 2.

U.S. Army Corps of Engineers, 1996, *Safety and Health Requirements Manual, EM-385-1-1,* September.

Tables

Table 1
Chemical Properties and Exposure Limits

Contaminant	Physical Description	Chemical and Physical Properties	Occupational Exposure Limits	Incompatibilities	Symptoms of Exposure
lead	Soft ductile heavy gray solid	FP: NA VP: 0 LEL: NA UEL: NA IP: NA	PEL 0.05 mg/M³ STEL NA IDLH 100.0 mg/M³	Strong oxidizers, hydrogen peroxide, acids	Weakness, insomnia pallor, malnutrition, abdominal pain, tremors, kidney disease

IDLH denotes immediately dangerous to life or health level established by the National Institute for Occupational Safety and Health.

PEL denotes permissible exposure limit expressed as an 8 hour time-weighted average, enforced by the California Division of Occupational Safety and Health.

STEL denotes short-term (15 minute) exposure limit enforced by the California Division of Occupational Safety and Health.

VP denotes vapor pressure (mm Hg).

FP denotes flash point (°F).

LEL denotes lower explosive limit (%).

UEL denotes upper explosive limit (%).

IP denotes ionization potential (electron volts: eV).

mg/M³ denotes milligrams per cubic meter of air.

Table 2
Action Levels

Contaminant	Action Level[a]	Required Action[b]
Oxygen deficiency	< 19.5 % or > 23.5%	Forbid entry, increase ventilation
Combustible gases	> 10% LEL	Entry not allowed, increase ventilation. Locate and eliminate source.
Lead dust (during lead based paint abatement)	> 0.03 mg/M^3	Comply with Cal/OSHA lead standard

[a]Five readings exceeding the action level in any 15-minute period or a sustained reading exceeding the action level for 5 minutes will trigger a response.

[b]Frequency of air monitoring may be adjusted by the Program CIH after sufficient characterization of site contaminants has been completed, tasks have been modified, or site controls have proven effective.

BZ denotes breathing zone.

CIH denotes Certified Industrial Hygienist.

LEL denotes lower explosive limit (%).

UEL denotes upper explosive limit (%).

mg/M^3 denotes milligrams per cubic meter of air.

No one is permitted to downgrade levels of PPE without authorization from the Program CIH.

Attachment A
Site-Specific Health and Safety Plan Amendment Form

SITE-SPECIFIC HEALTH & SAFETY PLAN
Amendment Documentation

Project Name: ______________________________ **Project No.:** ____________________

Amendment No.: ____________________________ **Date:** __________________________

Amendment Revisions: Page:__________________ **Section:** ________________________

Task(s) Amendment Affects*: ____

____

*(*Attach new/revised Job Safety Analyses*)

Reason for Amendment:

____

____

____

____

Amendment:
(Attach separate sheet(s) as necessary)

____

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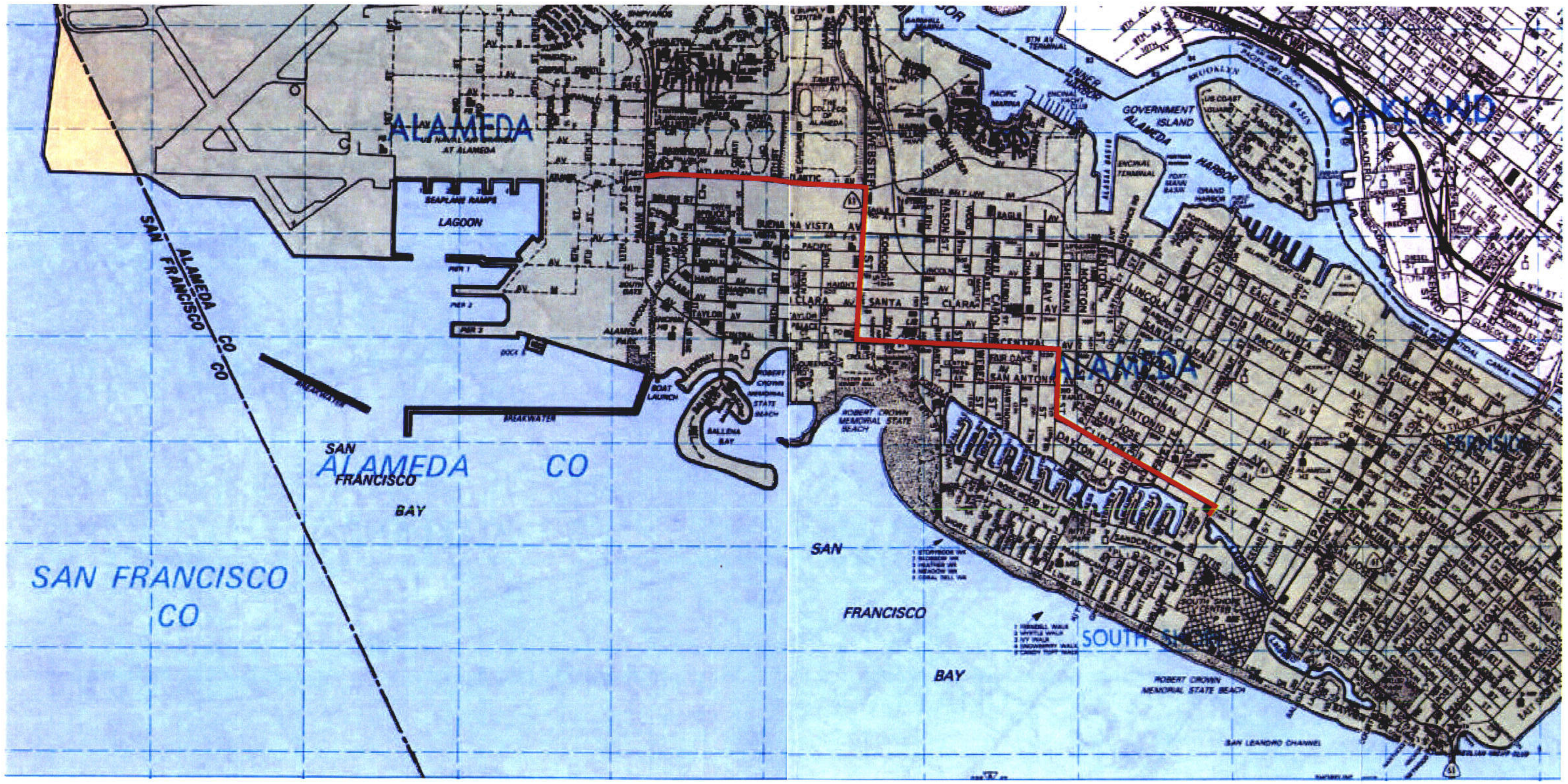
Completed by: ____________________________

Approved by: ____________________________

Attachment B
Site Map and Route to the Nearest Hospital



DIRECTIONS TO ALAMEDA HOSPITAL

FROM THE MAIN GATE,
TAKE MARINER SQUARE LOOP TO WEBSTER ST.
(HWY 61) AND TURN RIGHT. AFTER APPROXIMATELY
8 BLOCKS TURN LEFT (EAST) ON CENTRAL AVE.
CONTINUE ON CENTRAL AVE., TURN RIGHT ON SHERMAN ST.
(SOUTH) FROM SHERMAN ST., TURN LEFT ON CLINTON AVE.
CONTINUE ON WILLOW ST., TURN RIGHT TO HOSPITAL,
CORNER OF CLINTON AND WILLOW ST.

ALAMEDA HOSPITAL
2070 CLINTON AVE.
(510) 523-4357

REFERENCE:
THOMAS BROS. MAPS

NOT TO SCALE

Shaw Environmental, Inc.

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SOUTHWEST DIVISION
SAN DIEGO, CALIFORNIA

SITE AND
HOSPITAL ROUTE MAP
ALAMEDA POINT
ALAMEDA, CALIFORNIA

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
PH1.JPG PH2.JPG		Concord	R. LANGSTON 12/3/03	SK 12/3/03	JW 12/3/03	807181-B129

Attachment C
Emergency Phone Numbers

Emergency Phone Numbers

Contact	Phone Number
Alameda Point Fire Department Emergency Non-Emergency	911
Alameda Point Police/Security Department Emergency Non-Emergency	911
Alameda Point HAZMAT Response Emergency Non-Emergency	911
Hospital: Alameda Hospital Emergency Room Information Directions To Medical Care: From the main gate, take Mariner Square loop to Webster Street. (Hwy. 61) and turn right. After approximately 8 blocks, turn left (East) onto Central Ave. Continue on Central Ave. Turn right onto Sherman Street (South). From Sherman Street, turn left onto Clinton. Continue on Clinton. Alameda Hospital is at 2070 Clinton Ave., the corner of Clinton and Willow.	(510) 523-4357
Key Project and Shaw Personnel	
Shaw Program Manager: Stewart Bornhoft	(925) 288-2081
Program CIH: Fred Mlakar, CIH	(949) 660 5413 Cell: (949) 981-1450
Project Manager: Daniel Shafer	(916) 565-4328
Site Health & Safety Specialist: Jim Wright	(925) 383-7646
Occupational Physician: Health Resources	(800) 350-4511
Medical Incident Reporting: Health Resources	(800) 350-4511
Navy Contact: Mr. Lou Ocampo	(619) 532-0969
Navy Contact ROICC: Bob Perricone	
Navy Contact ROICC Alternate: Greg Grace	(510) 749-5940
Navy On-Scene Coordinator: Doug DeLong	(510) 772-8832

Attachment D
Activity Hazard Analyses

ACTIVITY HAZARD ANALYSIS FOR ASBESTOS SURVEY/REMOVAL OF BULK FRIABLE ACM

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Asbestos Removal	Inhalation and Contact with Asbestos Containing Materials	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile gloves, neoprene of latex boots, air purifying respirator, depending on ?action levels? (see Section 5.0 HASP)	Aerosol fiber monitor, Personal sampling pump
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb per person for manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools, excavated material, and other debris • Mark, identify, or barricade other obstructions		
	Fires	• Test atmospheres with combustible gas meter when working around flammable materials • Eliminate sources of ignition from the work area • Prohibit smoking in work areas • Prohibit storage, transfer of flammable liquids in plastic containers • Provide ABC (or equivalent) fire extinguishers in all work areas • Post "NO SMOKING" signs • Store combustibles away from compressors, other fuel powered equipment		LEL/O_2

ACTIVITY HAZARD ANALYSIS FOR
ASBESTOS SURVEY/REMOVAL OF BULK FRIABLE ACM

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Asbestos Removal (continued)	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow lockout-tagout procedures in accordance with SEI Health and Safety Procedure # HS 315	Lockout-Tagout devices	Voltage Meter or ?Tic?Tracer
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with SEI Health and Safety Procedures # HS400, HS401 • Provide fluids to prevent worker dehydration • Follow work/rest schedule in Section 3.3.1/3.3.2 of the HASP	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

ACTIVITY HAZARD ANALYSIS FOR
CAP AND SEAL INLETS TO PIPING

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Cap and seal inlets to piping	Underground utilities	All underground utilities will be located prior to capping activities.
	Open trenches	IT Policy and Procedure HS307 – "Excavation and Trenching" will be adhered to at all times.
	Contact with potentially contaminated materials	Real time air monitoring will take place. If necessary proper personal protective clothing and equipment will be utilized.
	Noise	Noise levels above 85 dBA mandates hearing protection.
	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tag out procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Getting off or on any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.
		Bulldozer and scraper blades, end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use.
		All self-propelled construction equipment shall be equipped with a back-up alarm.

ACTIVITY HAZARD ANALYSIS FOR CAP AND SEAL INLETS TO PIPING

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Cap and seal inlets to piping (cont.)	Fire	Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 1A5BC
	Confined space	IT Policy and Procedure HS300 - "Confined Spaces" will be adhered to at all times.
	Contact with grout materials	Proper protective clothing and equipment will be used.
		MSDSs will be obtained and reviewed with all applicable employees.
	Pinch points	Keep hands, fingers, and feet clear of moving/suspended materials and equipment.
	Cut hazards	Wear adequate hand protection.
	Structural collapse	Inspect the integrity of the area before climbing or walking.
		Pieces of the structure that are being cut away will be adequately supported to avoid structural failure or personal injury.
	Working at elevated heights/falls	Ladders will be secured by top, bottom, and intermediate fastenings as required.
		Personnel working at heights of 6 feet or more must be secured with fall protection.
	Insects, spiders and snakes	Inspect work areas carefully and avoid placing hands and feet into concealed areas.
	Strains/sprains	Use the proper tool for the job being performed.
	Strains/sprains	Get assistance if needed.
		Avoid twisting/turning while pulling on tools, etc.
	Lighting	Adequate lighting will be provided to insure a safe working environment.
	Unattended worker	"Buddy System" - visual contact will be maintained with the technician during cutting activities.

Equipment to be Used	Inspection Requirements	Training Requirements
• Plumbing Tools • Hand Tools • Heavy Equipment • PPE	• Pre-post maintenance • Visual prior to use • CESPD 150 R	• Tailgate safety meeting • Site specific orientation • Hazardous waste operations • Hazard communication

ACTIVITY HAZARD ANALYSIS FOR CONFINED SPACE ENTRY

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Air Monitoring Devices
Confined Space Entry	Underground/ Vault Utilities	• Identify all utilities around the site before work commences • Cease work immediately if unknown utility markers are uncovered • Use manual excavation within 3 feet of known utilities		
	Excavation Wall Collapse	• Construct diversion ditches or dikes to prevent surface water from entering excavation • Provide good drainage of area adjacent to excavation • Collect ground water/rain water from excavation and dispose of properly • Store excavated material at least 2 feet from the edge of the excavation; prevent excessive loading of the excavation face • Provide sufficient stairs, ladders, or ramps when workers enter excavations over 4 feet in depth • Place ladders no more than 25 feet apart laterally • Treat excavations over 4 feet deep as confined spaces • Complete confined space permit entry procedure • Monitor atmosphere for flammable/toxic vapors, and oxygen deficiency • Slope, bench, shore, or sheet excavations over 5 feet deep if worker entry is required • Assign a competent person to inspect, decide soil classification, proper sloping, the correct shoring, or sheeting • Inspect excavations (when personnel entry is required) daily, whenever conditions change • Provide at least two means of exit for personnel working in excavations	Hard hat, Safety glasses, Steel toe work boots	

ACTIVITY HAZARD ANALYSIS FOR CONFINED SPACE ENTRY

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Air Monitoring Devices
Confined Space Entry (Continued)	Hazardous Energy	• De-energize or shut off utility lines at their source before work begins • Block, blank or break lines that could cause engulfment or temperature extreme • Test circuits / equipment to verify lock-out • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Label all electrical boxes > 200 volts with circuit voltage • Follow Lockout-Tagout procedures in accordance with SEI Health and Safety Procedures # HS315	Lockout/Tagout Devices	Voltage Meter or ?Tic? Tracer
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Wizard or similar cut resistant gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter

ACTIVITY HAZARD ANALYSIS FOR CONFINED SPACE ENTRY

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Air Monitoring Devices
Confined Space Entry (Continued)	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris • Mark, identify, or barricade other obstructions • Evaluate fall hazards above 4 ft.; use fall protection equipment (harness/lanyard), standard guardrails or other fall protection systems when working on elevated platforms above 6 ft. • Use 'heavy duty industrial' (type IA) ladders • Tie-off all straignt/extension ladders or manually hold by co-worker at base		
	Fire/ Explosion	• Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers in all work, flammable storage areas and with fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Prohibit storage, transfer of flammable liquids in plastic containers • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum	Portable fire extinguisher	LEL/O_2

ACTIVITY HAZARD ANALYSIS FOR CONFINED SPACE ENTRY

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Air Monitoring Devices
Confined Space Entry (Continued)	Flammable, Toxic, Oxygen deficient Atmospheres	• Test vessel atmosphere for flammable/toxic vapors, and oxygen deficiency • Obtain Confined Space Entry Permit signed by Supervisor/Safety Officer • De-energize, lock-out and tag all energized equipment • Provide written rescue plan • Review hazardous properties of site contaminants with entrants and safety observer • Review emergency procedures before work commences • Provide safety observer outside vessel • Wear proper level of PPE for the type of atmospheric contaminants • Use body harness, safety belt with tripod winch for possible rescue	Portable fire extinguisher	LEL/O_2
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile gloves, latex or neoprene boots (see Section 5.0 HASP)	LEL/O_2, PID
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with SEI Health and Safety Procedures # HS400, HS401 • Provide fluids to prevent worker dehydration • Follow work/rest schedule in Section 3.3.1/3.3.2 of the HASP	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

ACTIVITY HAZARD ANALYSIS FOR CONSOLIDATE CONSTRUCTION DEBRIS

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Consolidate Construction Debris	Struck By/ Against Heavy Equipment	• Wear reflective warning vests worn when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals	Warning vests, Hard hat, safety glasses, Steel toe work boots	
	Slips, Trips, Falls	• Clear walkways work areas of equipment, tools, vegetation, excavated material and debris • Mark, identify, or barricade other obstructions • Maintain 3 point contact when ascending/descending ladders/ mounting/dismounting from heavy equipment • Halt exterior work in high winds, lightning, severe weather		
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use • Close doors, windows on heavy equipment to prevent injuries from tree branches and other vegetation	Leather gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85 dB A TWA	Ear plugs	Sound Level Meter
	High Ambient Temperature	• Monitor for Heat stress in accordance with SEI Health and Safety Procedures # HS400 • Provide fluids to prevent worker dehydration • Follow work/rest schedule in Section 3.3.1/3.3.2 of the HASP		Meteorological Equipment

ACTIVITY HAZARD ANALYSIS FOR
DEBRIS REMOVAL

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
Remove/dispose of scrap metal.	Unfamiliarity with: site, general site hazards, project safety rules, chain of command, and emergency procedures.	All personnel shall attend the site orientation training.
	Heavy lifting, strains, and sprains.	No individual employee is permitted to lift any object that weighs over 60 pounds. Proper lifting techniques shall be used. Multiple employees or the use of mechanical lifting devices are required for lifting objects over the 60-pound limit.
	Struck-by/Against.	Wear reflective warning vests when exposed to vehicular traffic. Isolate potential equipment swing areas. Avoid/isolate survey activities in high traffic areas. Make eye contact with vehicle operators before approaching/crossing high traffic areas. Understand and review hand signals. Do not attempt verbal communication in high noise backgrounds.
	Slips, trips, falls.	Keep work areas clear and maintain housekeeping. Personnel shall not jump from elevated surfaces. Personnel shall avoid walking of working on metal.
	Hand injuries.	Items to be handled shall be inspected for sharp edges prior to being handled. Personnel shall wear leather gloves when handling sharp materials. Personnel shall be aware of and avoid pinch point hazards.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Reflective vests Leather gloves	Site inspections (daily)	Site orientation HAZWOPER Lifting/back safety

ACTIVITY HAZARD ANALYSIS FOR DEBRIS REMOVAL

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
Remove/dispose of scrap metal (continued).	Use of heavy equipment.	Only qualified personnel shall be permitted to operate equipment. Heavy equipment shall be inspected daily. Deficiencies in equipment shall be noted on the inspection form. Equipment found to be unsafe shall not be used. All equipment shall be operated at safe speeds and in a safe manner. Equipment operators shall wear safety belts and hearing protection. Ground personnel shall not position themselves between equipment and stationary objects and only approach equipment after a signal from the operator. Personnel are prohibited from entering the swing radius of booms.
	Cutting scrap metal.	Hot Work shall be avoided – use cold-cutting techniques when possible. If Hot Work procedures are necessary, IT Corp. Hot Work Permitting procedures shall be followed. Personnel shall not be permitted in the swing radius of the equipment. Personnel shall maintain a safe distance from shearing operations and be aware that cut pieces may fly a considerable distance. Cutting shall only be performed in areas clear of overhead hazards. Set up cutting area away from other operations when possible.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hearing protection Oxy-acetylene torch Hydraulic shears	Heavy equipment (daily) Oxy-acetylene torch (before each use)	Site orientation HAZWOPER Qualified equipment operators

ACTIVITY HAZARD ANALYSIS FOR
DEBRIS REMOVAL

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
Remove/dispose of scrap metal (continued).	Dust.	Personnel shall avoid working in dust. Air monitoring shall be performed as necessary. Visible dust shall be controlled. If dust is not adequately controlled, then respiratory protection will be required.
	Contaminated soil.	Physical contact with potential contaminated media ("slime") shall be avoided. PPE use is required when contact is possible/probable. Personnel who sustain skin contact shall immediately wash the affected area with soap and water and report the incident to the SSHO.
	Fire.	Smoking shall not be permitted in regulated areas. Cigarette butts shall be extinguished and disposed of in ashtrays. Vehicles shall not be parked in tall dry grass. Engines shall be shut off before refueling. A 40-A:B:C fire extinguisher shall be available at refueling areas. Smoking shall not be permitted near fueling areas.
	Noise.	Heavy equipment operators shall wear hearing protection to reduce exposures to below the OSHA limits.
Remove asphalt/scrap soils.	Underground utilities.	Underground utilities shall be located and marked prior to subgrade reconditioning activity. All electrical, gas, and telephone utilities are to be hand dug within three feet of utility markings. The phone numbers for specific utilities shall be posted by IT controlled telephones

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
PPE – See SSHP Real-time aerosol monitor Eyewash station Fire extinguishers Hearing protection	Site inspections (daily) Heavy equipment (daily) Eyewash station (weekly) Fire extinguishers (weekly)	Site orientation Qualified equipment operators HAZWOPER (if working with contaminated media) Specific equipment operator's manuals Fire extinguisher Hearing conservation

ACTIVITY HAZARD ANALYSIS FOR
DEBRIS REMOVAL

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
Remove asphalt/scrap soils (continued).	Use of heavy equipment.	Only qualified personnel shall be permitted to operate equipment. Heavy equipment shall be inspected daily. Deficiencies in equipment shall be noted on the inspection form. Equipment found to be unsafe shall not be used. All equipment shall be operated at safe speeds and in a safe manner. Equipment operators shall wear safety belts and hearing protection. Ground personnel shall not position themselves between equipment and stationary objects and only approach equipment after a signal from the operator. Personnel are prohibited from entering the swing radius of booms. Personnel shall ensure all mechanical guards are in place and functioning properly. All equipment shall be shut down with energies dissipated prior to performing maintenance activities lockout/tagout procedures may apply. Only qualified mechanics shall work on equipment.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Hearing protection	Heavy equipment (daily)	Site orientation HAZWOPER Qualified equipment operators

ACTIVITY HAZARD ANALYSIS FOR DEBRIS REMOVAL

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
Remove asphalt/scrap soils (continued).	Rolling/tipping equipment.	All heavy equipment shall be equipped with ROPS. All equipment operators shall wear seat belts while equipment is in motion. The specific operator's manual for each piece of equipment shall be consulted for recommended limitations regarding operation on slopes.
	Dust.	Personnel shall avoid working in dust. Air monitoring shall be performed as necessary. Visible dust shall be controlled. If dust is not adequately controlled, then respiratory protection will be required.
	Contaminated soil.	Physical contact with potential contaminated media ("slime") shall be avoided. PPE use is required when contact is possible/probable. Personnel who sustain skin contact shall immediately wash the affected area with soap and water and report the incident to the SSHO.
	Fire.	Smoking shall not be permitted in regulated areas. Cigarette butts shall be extinguished and disposed of in ashtrays. Vehicles shall not be parked in tall dry grass. Engines shall be shut off before refueling. A 40-A:B:C fire extinguisher shall be available at refueling areas. Smoking shall not be permitted near fueling areas.
	Slip, trips, and falls.	Personnel shall be cautious when walking/working on slippery surfaces. Heavy equipment operators shall use extra care when climbing into/out of equipment.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
PPE – See SSHP Real-time aerosol monitor Eyewash station Fire extinguishers	Site inspections (daily) Heavy equipment (daily) Eyewash station (weekly) Fire extinguishers (weekly)	Site orientation Qualified equipment operators HAZWOPER (if working with contaminated media) Specific equipment operator's manuals Fire extinguisher

ACTIVITY HAZARD ANALYSIS FOR
DEBRIS REMOVAL

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
Remove asphalt/scrap soils (continued).	Noise.	Heavy equipment operators shall wear hearing protection to reduce exposures to below the OSHA limits.
	Dump truck operations.	Dump trucks shall be inspected daily. All drivers shall exit dump trucks and wait in a designated upwind location while truck is being loaded unless truck is equipped with a cab shield and/or canopy adequate to protect operator from falling or shifting materials. Trucks shall follow designated routes. Drivers shall observe all imposed speed limits and traffic control devices. Operators shall wear seat belts while trucks are in motion. Spotters shall assist trucks when backing is necessary. All overhead hazards shall have been surveyed and evaluated in regards to dump truck operations. Minimum clearance specifications (Table 11-3 of EM 385-1-1) shall be enforced. All dumping of loads shall be performed on grades as specified in the equipment's operator's manuals.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Level D PPE Hearing protection	Site inspections (daily) Dump trucks (daily)	Site orientation Hearing conservation CDL Driver

ACTIVITY HAZARD ANALYSIS FOR DEBRIS REMOVAL

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
Equipment decontamination (if necessary).	Potential contaminated soil or hazardous chemicals.	All personnel associated with the use of steam/pressure washers shall wear appropriate PPE. Rain gear over Saranex or poly-coated Tyvek coveralls shall be worn by personnel in addition to Nitrile or PVC gloves and PVC or Latex boot covers. Face shields and leg protectors shall be worn in addition to other PPE. Physical contact with contaminated media or hazardous chemicals shall be avoided. Personnel who sustain skin contact shall immediately wash the affected area with soap and water (eyes should be irrigated for 15 minutes with potable water) and report the incident to the SSHO. Personnel shall wash hands and face at the conclusion of decontamination activities and before breaks.
	Slips, trips, falls.	Personnel shall be cautious when walking/working on slippery surfaces. Personnel lifts or scaffolding shall be used to access the tops of large/heavy equipment that must be cleaned. Fall protection shall be used when working at heights greater than six feet. Good house keeping shall be maintained in decontamination area. Hoses and extension cords shall be kept/used in an orderly fashion.
	Struck by/smashed by equipment.	All equipment shall be shut off and a positive means taken to prevent its operation prior to decontamination. All dump beds on trucks shall be blocked if bed is cleaned in raised position.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Pressure/steam washer Dermal PPE (i.e., metatarsal/shin guards, face shield, etc.) Fall protection	Fall protection (before each use) Scaffolding (before use/daily)	Site orientation HAZWOPER (if cleaning contaminated equipment) Fall protection Scaffolding/Scaffolding competent person

ACTIVITY HAZARD ANALYSIS FOR DEBRIS REMOVAL

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
Equipment decontamination (continued).	Pressure/steam washing.	The pressure/steam washer shall be inspected before each use. The manufacturer's instruction manual shall be used to guide the inspection process. Personnel shall be trained in the use of the washing equipment. All personnel working in the equipment decontamination area shall be trained in the emergency shut-off procedures for the equipment being used. The minimum amount of steam/pressure that will complete the job should be used. Pressure washers exceeding 3000 psi shall not be used without the approval of the CIH. The spray from such equipment shall only be directed at surfaces to be cleaned and never at body parts or other personnel. Personnel in the immediate area shall use face shields and metatarsal/shin guards. The internal combustion engines, used to power the pressure/steam washer, shall never be operated indoors unless the CIH is notified. Personnel shall keep firm grip on wand and not point it at anything that is not being washed. That operator must maintain good footing. The trigger on the wand shall never be wired/fixed open. Operator to take adequate breaks to avoid fatigue. Hot surfaces shall be avoided. Units shall be shut off and allowed to cool prior to re-fueling.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Dermal PPE (i.e., metatarsal/shin guards, face shield, etc.)	Site inspection (daily) Pressure/steam washer (daily per manufacturer)	Site orientation HAZWOPER Pressure/steam washer operation

ACTIVITY HAZARD ANALYSIS FOR DEMOLITION OF ABOVE GROUND STORAGE TANK AND ASSOCIATED PIPING

Activity	Hazards	Control Measures
Utility clearance	Electrocution	Lock out/tag out procedures are required for all active lines
Pipe removal	See "pipe removal" AHA	See "pipe removal" Activity Hazard Analysis
Demolition of concrete structures	Dust	Use dust suppression at all times.
	Heavy equipment	Trained operators must operate equipment.
		Inspect all equipment before use each day.
Free Product recovery	Pressurized system	Remove caps slowly in open areas.
	Contact with pipeline material	Wear proper PPE.
	Spills	Make spill-absorbing materials available.
	Fire	Prohibit open flames within 50 feet of work area.
		Locate fire extinguisher within 10 feet of pipe draining and cleaning activities
	Chemical exposure	Conduct air monitoring in accordance with Section 8 of this document.
Demolition of tank	Dust	Use dust suppression at all times.
	Lead based paint	Analyze paint for lead content. If lead is present; develop a lead management plan for the project.
	Heavy equipment	Stay clear of swing radius of equipment.
		Only qualified operators are allowed to operate equipment.
		Nonessential personnel must remain outside of the work area.
	Work from elevated locations	All work from elevated locations must be conducted in accordance with HSOP

ACTIVITY HAZARD ANALYSIS FOR
DEMOLITION OF ABOVE GROUND STORAGE TANK AND ASSOCIATED PIPING

Equipment	Inspection	Training
• Heavy equipment • Fall protective	• Pre/post use	• Tailgate safety meeting • Hazardous waste operations • Fall protection • Lockout/tag out

CONTRACTOR'S ACTIVITY HAZARD ANAYLSIS
DEMOLITION OF STRUCTURES AND BUILDINGS

Activity	Hazards	7ontrol Measures
Utility clearance	Electrocution	Lockout/tag out of all electrical sources
Demolition	Dust	Dust suppression to be used during activities that create dust
		Real time air monitoring will be conducted for dust in accordance with Section 8 of this document
	Heavy equipment	Only trained operators shall operate equipment
		All equipment will be inspected prior to use each day
		Non essential personnel will stay out of work area
		All personnel will stay out of the swing radius of equipment
	Noise	Hearing protection required
	Fire	Hot work permit required for all cutting operations
	Vehicle traffic	Workers will wear high visibility vest. Haul roads will be established for equipment
Tree removal	Poison ivy/oak	Inspect area prior to site activities
		Wear Modified Level D if plants in area
	Insects	Inspect area
		Prior to activities refer to PHSP for detailed info
	Chain saw operation	Only trained personnel will operate chain saws
		All operations will be in compliance with EM 385-1-1, Section 13.F Chainsaws
		Face shield, leather gloves, and chainsaw chaps are required
	Tree falling	All operations will be conducted in accordance with EM 385-1-1, Section 31 "Tree Maintenance and Removal"

Equipment	Inspection	Training
• Heavy equipment • Air monitoring • Traffic control • Chainsaws • PPE • Fall protection • Hand tools	• Pre- / Post-Use	• Tailgate safety meeting • Site specific • Hazwaste operations • Hazmat • Chainsaw operation • Fall protection training

ACTIVITY FOR
DISPOSAL OF CONSTRUCTION DEBRIS

Activity	Potential Hazards	Recommended Controls
Removal of debris	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
	Areas on or adjacent to contaminated material	Implement appropriate level of protection.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventative maintenance procedures recommended by the manufacturer shall be followed.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Overhead power lines	See distances
	Fire	Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 1A5BC.
	Dump tuck operations	Dump truck bodies shall be fully lowered or blocked when maintenance is being performed or when not in use.
Equipment to be Used	**Inspection Requirements**	**Training Requirements**
Hand tools PPE Heavy equipment	Pre-/post-maintenance Visual prior to use CESPD Form 150-R	Tailgate Safety Meeting Site-specific orientation Hazardous waste operations Hazard communication

ACTIVITY HAZARD ANALYSIS FOR EQUIPMENT DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Equipment Decontamination	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, tools and debris • Mark, identify, or barricade other obstructions • Maintain 3 point contact when mounting/dismounting heavy equipment		
	Struck by/Against Heavy Equipment, Protruding Objects	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Require backup alarms on all heavy construction equipment • Make eye contact with operators before approaching equipment • Understand and review hand signals	Warning vests, hard hat safety glasses, goggles and face shield, steel toe work boots	
	Inhalation and Contact with Hazardous Substances, & Splashes	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Wear hard hats, safety glasses with side shields, or goggles with splash shields and steel-toe safety boots	PVC rain suit or Tyvek coveralls, hard hat safety glasses, goggles and face shield, nitrile or latex gloves, neoprene or latex boots (See Section 5.0 HASP)	
	Burns	• Wear proper gloves, face shield/safety goggles, shin and toe guards, and splash suits to protect workers from skin burns and injury when operating laser (high pressure washers)	Goggles and face shield, shin and toe guards	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		

ACTIVITY HAZARD ANALYSIS FOR EQUIPMENT DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Equipment Decontamination (Continued)	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with SEI Health and Safety Procedures # HS400, HS401 • Provide fluids to prevent worker dehydration • Follow work/rest schedule in Section 3.3.1/3.3.2 of the HASP	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

ACTIVITY HAZARD ANALYSIS FOR FACILITY DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Walls, Floors, Sumps, Pits	Struck by/ Against Heavy Equipment, Protruding Objects	• Use reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Wear hard hats, safety glasses with side shields, and steel-toe safety boots • Understand and review hand signals	Hard hat, safety glasses, Steel-toe boots	
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions • Evaluate fall hazards above 4 ft.; use fall protection equipment (harness/lanyard), standard guardrails or other fall protection systems when working on elevated platforms above 6 ft. • Use ?heavy duty industrial? (type IA) ladders • Install and inspect scaffolds according to manufacturers requirements • Only trained operators are permitted to use aerial lifts • Tie-off all straignt/extension ladders or manually hold by co-worker at base • Anchorage points for fall arrest systems must support at least 5,400 pounds for each worker • Halt roof, exterior scaffold work in high winds, severe weather		
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	

ACTIVITY HAZARD ANALYSIS FOR FACILITY DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Walls, Floors, Sumps, Pits (Continued)	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads • Avoid carrying heavy objects above shoulder level • Avoid actions/activities that contribute to overexertion • Warm up muscles before engaging in manual lifting activities • Review lifting posture/techniques regularly at safety meetings		
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	Burns	• Use proper work gloves, face shield/safety goggles, and leather apron to protect workers from skin burns when welding, cutting, and burning	Leather gloves, face shield safety goggles	

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ACTIVITY HAZARD ANALYSIS FOR FACILITY DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Walls, Floors, Sumps, Pits (Continued)	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants before beginning work • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile or latex gloves, latex or neoprene boots (See Section 5.0 HASP)	LEL/O_2; PID; Mini-RAM
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with SEI Health and Safety Procedures # HS315	Lockout-Tagout Devices	Voltage Meter or ?Tic? Tracer

ACTIVITY HAZARD ANALYSIS FOR FACILITY DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Process Equipment/ Piping	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants before beginning work • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile or latex gloves, latex or neoprene boots (See Section 5.0 HASP)	LEL/O_2; PID; Mini-RAM
	Struck by/ Against Heavy Equipment, Protruding Objects	• Use reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Wear hard hats, safety glasses with side shields, and steel-toe safety boots • Understand and review hand signals	Hard hat, safety glasses, Steel-toe boots	

ACTIVITY HAZARD ANALYSIS FOR FACILITY DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Process Equipment/ Piping (Continued)	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions • Evaluate fall hazards above 4 ft.; use fall protection equipment (harness/lanyard), standard guardrails or other fall protection systems when working on elevated platforms above 6 ft. • Use ?heavy duty industrial? (type IA) ladders • Install and inspect scaffolds according to manufacturers requirements • Only trained operators are permitted to use aerial lifts • Tie-off all straignt/extension ladders or manually hold by co-worker at base • Anchorage points for fall arrest systems must support at least 5,400 pounds for each worker • Halt roof, exterior scaffold work in high winds, severe weather		
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. Maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads • Avoid carrying heavy objects above shoulder level • Avoid actions/activities that contribute to overexertion • Warm up muscles before engaging in manual lifting activities • Review lifting posture/techniques regularly at safety meetings		

ACTIVITY HAZARD ANALYSIS FOR FACILITY DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Process Equipment/ Piping (Continued)	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with SEI Health and Safety Procedures # HS315	Lockout-Tagout Devices	Voltage Meter or ?Tic? Tracer
	Burns	• Use proper work gloves, face shield/safety goggles, and leather apron to protect workers from skin burns when welding, cutting, and burning	Leather gloves, leather apron or chaps	

ACTIVITY HAZARD ANALYSIS FOR FACILITY DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Process Equipment/ Piping (Continued)	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
HVAC Equipment	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. Maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with SEI Health and Safety Procedures # HS315	Lockout-Tagout Devices	Voltage Meter or ?Tic? Tracer

ACTIVITY HAZARD ANALYSIS FOR FACILITY DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
HVAC Equipment (Continued)	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present (See Section 5.0 HASP) • Review hazardous properties of site contaminants before starting work • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, latex or nitrile gloves, latex boots or neoprene boots (See Section 5.0 HASP)	LEL/O_2; PID; Mini-RAM

ACTIVITY HAZARD ANALYSIS FOR FACILITY DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
HVAC Equipment (Continued)	Fire/ Explosion	• Test vessel atmosphere for flammable atmosphere • Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers in all work, flammable storage areas and with fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Prohibit storage, transfer of flammable liquids in plastic containers • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum	Portable fire extinguishers	LEL/O_2
Tanks and Vats	Struck by/ Against Heavy Equipment, Protruding Objects	• Use reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Wear hard hats, safety glasses with side shields, face shields, and steel-toe safety boots • Understand and review hand signals	Hard hat, safety glasses, steel-toe boots	
	Slips, Trips, Falls	• Clear walkways work areas of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions		

ACTIVITY HAZARD ANALYSIS FOR FACILITY DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Tanks and Vats	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. Maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		

ACTIVITY HAZARD ANALYSIS FOR FACILITY DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Tanks and Vats (Continued)	Flammable, Toxic, Oxygen deficient Atmospheres	• Test vessel atmosphere for flammable/toxic vapors, and oxygen deficiency • Obtain Confined Space Entry Permit signed by Supervisor/Safety Officer • De-energize, lock-out and tag all energized equipment • Provide written rescue plan • Review emergency procedures before work commences • Review MSDS information with entrants and safety observer • Provide safety observer outside vessel • Wear proper level of PPE for the type of atmospheric contaminants • Use body harness, safety belt with tripod winch for possible rescue	Tyvek coveralls, nitrile gloves, latex or neoprene boots (See Section 5.0 HASP)	LEL/O_2; PID
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
	Burns	• Use proper work gloves, face shield/safety goggles, and leather apron to protect workers from skin burns when welding, cutting, and burning	Leather Gloves, goggles and face shield	

ACTIVITY HAZARD ANALYSIS FOR FACILITY DECONTAMINATION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Tanks and Vats (Continued)	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with SEI Health and Safety Procedures # HS315	Lockout-Tagout Devices	Voltage Meter or ?Tic? Tracer
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants before starting work • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile gloves, latex or neoprene boots (See Section 5.0 HASP)	LEL/O_2; PID; Mini-RAM

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Walls and Floors	Struck by/ Against Heavy Equipment, Flying Debris, Protruding Objects	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Barricade or enclose the demolition area • Restrict entry to the work area to authorized personnel during demolition activities • Wear hard hats, safety glasses with side shields, and steel-toe safety boots • Understand and review hand signals • Cease operations for electrical storms, high winds, severe weather	Warning vests, Hard hat, Safety glasses	
	Slips, Trips, Falls	• Clear, walkways of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions • Evaluate fall hazards above 4 ft.; use fall protection equipment (harness/lanyard), standard guardrails or other fall protection systems when working on elevated platforms above 6 ft. • Use 'heavy duty industrial' (type IA) ladders • Install and inspect scaffolds according to manufacturers requirements • Only trained operators are permitted to use aerial lifts • Tie-off all straignt/extension ladders or manually hold by co-worker at base • Anchorage points for fall arrest systems must support at least 5,400 pounds for each worker • Halt roof, exterior scaffold work in high winds, severe weather		

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Walls and Floors (Continued)	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads • Avoid carrying heavy objects above shoulder level • Avoid actions/activities that contribute to overexertion • Warm up muscles before engaging in manual lifting activities • Review lifting posture/techniques regularly at safety meetings		
	Fire/ Explosion	• Test atmospheres with combustible gas meter when working around flammable materials • Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers for all work and flammable storage areas, fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Prohibit storage, transfer of flammable liquids in plastic containers • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum		LEL/O_2

ACTIVITY HAZARD ANALYSIS FOR
FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Walls and Floors (Continued)	Premature structural Collapse	• Barricade or enclose the demolition area • Restrict entry to the work area to authorized personnel during demolition activities • Wear hard hats, safety glasses with side shields, and steel-toe safety boots • Understand and review posted hand signals	Warning vests, Hard hat, Safety glasses	
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with SEI Health and Safety Procedures #HS315	Lockout/Tagout Devices	Voltage Meter or ?Tic? Tracer

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Walls and Floors (Continued)	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
Process Equipment	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	Burns	• Wear proper work gloves, face shield/safety goggles, and leather apron to protect workers from skin burns when welding, cutting, and burning	Tinted face shield (see Section 5.0)	
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants • Dampen debris using water spray to prevent fugitive dust emissions	Tyvek coveralls, nitrile or latex gloves, neoprene or latex boots	LEL/O_2, PID
	Struck by/ Against Heavy Equipment, Flying Debris, Protruding Objects	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Barricade or enclose the demolition area • Restrict entry to the work area to authorized personnel during demolition activities • Wear hard hats, safety glasses with side shields, and steel-toe safety boots • Understand and review hand signals	Warning vests, Hard hat, Safety glasses	

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Process Equipment (Continued)	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions		
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Fire/ Explosion	• Test atmospheres with combustible gas meter when working around flammable materials • Eliminate sources of ignition from the work area • Prohibit Smoking • Provide ABC (or equivalent) fire extinguishers for all work and flammable storage areas, fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Prohibit storage, transfer of flammable liquids in plastic containers • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum		LEL/O_2

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Process Equipment (Continued)	Premature structural Collapse	• Barricade or enclose the demolition area • Restrict entry to the work area to authorized personnel during demolition activities • Wear hard hats, safety glasses with side shields, and steel-toe safety boots • Understand and review posted hand signals	Warning vests, Hard hat, Safety glasses	
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Process Equipment (Continued)	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with SEI Health and Safety Procedure # HS315	Lockout/Tagout Devices	Voltage Meter or ?Tic? Tracer

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Process Equipment (Continued)	Burns	• Wear proper work gloves, face shield/safety goggles, and leather apron to protect workers from skin burns when welding, cutting, and burning	Tinted goggles/face shield (see Section 5.0)	
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile or latex gloves, neoprene or latex boots (see Section 5.0 HASP)	LEL/O_2, PID
	Caught In/ Between Moving Parts	• Identify and understand parts of equipment which may cause crushing, pinching, rotating or similar injuries • Wear proper work gloves when the possibility of pinching, or other injury may be caused by moving/ handling large or heavy objects • Maintain all equipment in a safe condition • Keep all guards in place during use • De-energize and lock-out machinery before maintenance or service		
Piping	Struck by/ Against Heavy Equipment, Flying Debris, Protruding Objects	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Barricade or enclose the demolition area • Restrict entry to the work area to authorized personnel during demolition activities • Wear hard hats, safety glasses with side shields, and steel-toe safety boots • Understand and review hand signals	Warning vests, Hard hat, Safety glasses	

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Piping (Continued)	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris • Mark, identify, or barricade other obstructions • Evaluate fall hazards above 4 ft.; use fall protection equipment (harness/lanyard), standard guardrails or other fall protection systems when working on elevated platforms above 6 ft. • Use 'heavy duty industrial' (type IA) ladders • Install and inspect scaffolds according to manufacturers requirements • Only trained operators are permitted to use aerial lifts • Tie-off all straignt/extension ladders or manually hold by co-worker at base • Anchorage points for fall arrest systems must support at least 5,400 pounds for each worker		

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Piping (Continued)	Fire/ Explosion	• Test atmospheres with combustible gas meter when working around flammable materials • Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers for all work and flammable storage areas, fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Prohibit storage, transfer of flammable liquids in plastic containers • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum		LEL/O_2

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Piping (Continued)	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with SEI Health and Safety Procedures # HS315	Lockout/Tagout Devices	Voltage Meter or ?Tic? Tracer
	Burns	• Wear proper work gloves, face shield/safety goggles, and leather apron to protect workers from skin burns when welding, cutting, and burning	Hard hat, Safety goggles, Face shield	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Piping (Continued)	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review contaminant chemical MSDSs with workers before operations begin • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile or latex gloves, neoprene or latex boots (see Section 5.0)	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Caught In/ Between Moving Parts	• Identify and understand parts of equipment which may cause crushing, pinching, rotating or similar injuries • Wear proper work gloves when the possibility of pinching, or other injury may be caused by moving/ handling large or heavy objects • Maintain all equipment in a safe condition • Keep all guards in place during use • De-energize and lock-out machinery before maintenance or service		

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
HVAC Equipment	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with SEI Health and Safety Procedure # HS315	Lockout/Tagout Devices	Voltage Meter or ?Tic? Tracer
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
HVAC Equipment (Continued)	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile or latex gloves, neoprene or latex boots (see Section 5.0)	PID
Tanks and Vats	Struck by/ Against Heavy Equipment, Flying Debris, Protruding Objects	• Use reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Barricade or enclose the demolition area • Restrict entry to the work area to authorized personnel during demolition activities • Wear hard hats, safety glasses with side shields, and steel-toe safety boots • Understand and review hand signals	Warning vests, Hard hat, Safety glasses	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Tanks and Vats (cont.)	Caught In/ Between Moving Parts	• Identify and understand parts of equipment which may cause crushing, pinching, rotating or similar injuries • Wear proper work gloves when the possibility of pinching, or other injury may be caused by moving/ handling large or heavy objects • Maintain all equipment in a safe condition • Keep all guards in place during use • De-energize and lock-out machinery before maintenance or service		
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris • Mark, identify, or barricade other obstructions		
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Tanks and Vats (cont.)	Flammable, Toxic, Oxygen deficient Atmospheres	• Test vessel atmosphere for flammable/toxic vapors, and oxygen deficiency • Review MSDS information with entrants and safety observer • Wear proper level of PPE for the type of atmospheric contaminants • Review contaminant MSDS before beginning work • Use body harness, safety belt with tripod winch for possible rescue • Obtain Confined Space Entry Permit signed by Supervisor/Safety Officer • De-energize, lock-out and tag all energized equipment • Provide trained safety observer outside vessel • Provide written rescue plan • Review emergency procedures before work commences		PID

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Tanks and Vats (Continued)	Fire/ Explosion	• Test atmospheres with combustible gas meter when working around flammable materials • Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers for all work and flammable storage areas, fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Prohibit storage, transfer of flammable liquids in plastic containers • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum		LEL/O_2
	Premature Structural Collapse	• Barricade or enclose the demolition area • Restrict entry to the work area to heavy equipment operator(s) and signaler(s) during demolition • Wear hard hats, safety glasses with side shields, and steel-toe safety boots • Understand and review hand signals	Warning vests, Hard hat, Safety glasses	

ACTIVITY HAZARD ANALYSIS FOR FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Tanks and Vats (Continued)	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
	Burns	• Wear proper work gloves, face shield/safety goggles, and leather apron to protect workers from skin bums when welding, cutting, and buming	Tinted goggles/face shield (see Section 5.0)	
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with SEI Health and Safety Procedures # HS315	Lockout/Tagout Devices	Voltage Meter or ?Tic? Tracer

ACTIVITY HAZARD ANALYSIS FOR
FACILITY DEMOLITION

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Tanks and Vats (Continued)	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile or latex gloves, neoprene or latex boots (see Section 5.0)	PID

ACTIVITY HAZARD ANALYSIS FOR FUEL LINE REMOVAL/DISPOSAL

Principal Steps	Potential Safety/Heath Hazards	Recommended Controls
Cold cutting and removal of pipe	Underground utilities	All underground utilities will be located prior to capping activities.
	Open trenches	Shaw Policy and Procedure HS307 – "Excavation and Trenching" will be adhered to at all times.
	Contact with potentially contaminated materials	Real time air monitoring will take place. If necessary proper personal protective clothing and equipment will be utilized.
		Assure piping is empty by drilling holes in top of pipes of unknown sections.
	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tag out procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Getting off or on any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		All repairs on machinery or equipment will be made at a location, which provides protections from traffic for repairpersons.
		Bulldozer and scraper blades, end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use.
		All self-propelled construction equipment shall be equipped with a back-up alarm.

ACTIVITY HAZARD ANALYSIS FOR FUEL LINE REMOVAL/DISPOSAL

Principal Steps	Potential Safety/Heath Hazards	Recommended Controls
Cold cutting and removal of pipe (*continued*)	Contact with moving equipment/vehicles	Work area will be barricaded/demarcated.
		Equipment will be laid out in an area free of traffic low.
	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
		Initial real-time air monitoring will take place.
	Fire (*continued*)	Cold cutting only. No hot work anticipated.
	Confined space	No confined space work anticipated.
	Electrical	Use GFCIs on all 110-volt circuits.
		Refer to Table 3-4 for minimum clearance.
	Contact with toxic materials	Proper protective clothing and equipment will be used. Level of protection upgrade.
		MSDSs will be obtained and reviewed with all applicable employees.
	Pinch points	Keep hands, fingers, and feet clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!
	Cut hazards	Wear adequate hand protection.
	Structural collapse	Inspect the integrity of the area before climbing or walking.
		Pieces of the structure that are being cut away will be adequately supported to avoid structural failure or personal injury.

ACTIVITY HAZARD ANALYSIS FOR FUEL LINE REMOVAL/DISPOSAL

Principal Steps	Potential Safety/Heath Hazards	Recommended Controls
Cold cutting and removal of pipe (*continued*)	Ropes, slings, chains, and hooks	The use of ropes, slings, and chains shall be in accordance with the safe recommendations of their manufacturer.
		Rigging equipment shall not be loaded in excess of its recommended safe working load.
		The use of open hooks is prohibited in rigging to lift any load where there is danger of relieving the tension on the hook due to the load or hook catching or fouling.
		Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during it use to insure that it is safe. Defective rigging equipment shall be removed from service.
		Rigging equipment, when not in use, shall be removed form the immediate work area and properly stored so as not to present a hazard.
		Taglines shall be used to control the loads being handled by hoisting equipment.
		All hoisting equipment shall be capable of passing a performance (operating) test prior to being placed into service.
	Hoisting equipment	At no time shall the hoisting equipment be loaded in excess of the manufacturers rating.
		While hoisting equipment is in operation, the operator shall not perform any other work and he/she shall not leave his/her position at the controls until the load has been safely landed or returned to the ground.
		A standard signal system shall be used on all hoisting equipment.
	Working at elevated heights/falls	Ladders will be secured by top, bottom, and intermediate fastenings as required.
		Personnel working at heights of 6 feet or more must be secured with fall protection.
	Bees, spiders, and snakes	Inspect work areas carefully and avoid placing hands and feet into concealed areas.
	Stains/sprains	Use the proper tool for the job being performed.
		Get assistance if needed.
		Avoid twisting/turning while pulling on tools, etc.

ACTIVITY HAZARD ANALYSIS FOR FUEL LINE REMOVAL/DISPOSAL

Principal Steps	Potential Safety/Heath Hazards	Recommended Controls
Cold cutting and removal of pipe (*continued*)	Slip, trip, and fall hazards	Determine best access route before transporting equipment.
		Good housekeeping, keep work area picked up and clean as feasible. Continually inspect the work area for slip, trip, and fall hazards.
		Look before you step, insure safe, and secure footing.
	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. Require assistance or mechanical equipment; size-up lift. Recommend wearing a back support if possible.
	Falling objects	Stay alert and clear of materials suspended overhead. Use steel-toed boots and hard hat.
	Flying debris, dirt, dust, etc.	Use safety glasses/goggles. Ensure that eye wash is in good working order.
	CO monitoring	Use diesel-fired equipment indoors.
	Electrical	Use GFCIs on all 110-volt circuits.
	Lighting	Provide adequate lighting to ensure a safe working environment.
	Unattended worker	"Buddy System" - visual contact will be maintained with the technician during cutting activities.
Removal of fuel products	Pressurized systems	All discharge hoses and connections shall be routinely inspected.
		Proper bonding and grounding.
	Fire	A dry chemical fire extinguisher with a minimum UL rating of A,B,C will be readily available.
	Explosions	LEL reading will be # 10% prior to pumping.
Cold cutting of the pipelines	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and in a fully charged and operable condition.
	Hand tools	Only use tool for the purpose that they were intended for.
		Red tag/discard broken tools.
		Watch for others in the area when using tools.

ACTIVITY HAZARD ANALYSIS FOR
FUEL LINE REMOVAL/DISPOSAL

Principal Steps	Potential Safety/Heath Hazards	Recommended Controls
Leak testing	Pressurized systems	All discharge hoses and connections will be inspected prior to each use.
		Properly position and maintain pressurized water systems to protect against vehicle and equipment damage.
	Hand tools	Use tools for the task intended and wear proper PPE.
		Broken or damaged tool use is prohibited. Repair or replace unsuitable equipment prior to use.
	Pinch hazards	Be aware of contact points and interferences between equipment and PPE.
		Wear hand protection.
	Open Excavations	Shaw Policy and Procedure HS307 A Excavation and Trenching will be adhered to at all times.
		Excavations will be backfilled as soon as possible.
Pressure injection of grout	Pressurized systems	All discharge hoses and connections will be routinely inspected.
		Discharge hose will be secured in place while pumping grout mix.
	Chemical exposure	MSDS for grout will be available at the site.
		Goggles on a face shield will be worn during the mixing of the grout
	Noise	Hearing protection will be worn by all personnel which are exposed to noise levels at 85 dBA or greater.
Vehicle traffic	Vehicle traffic	Pay attention at all times.
		Make sure that operators of vehicles know that you are near their equipment.
		A spotter will aid in the backing of all vehicles with poor rear visibility.
		Traffic diversion equipment will be used for all work being conducted in roadways.
		All personnel will wear safety vest.

ACTIVITY HAZARD ANALYSIS FOR FUEL LINE REMOVAL/DISPOSAL

Equipment to be Used	Inspection Requirements	Training Requirements
• Tools • Hand Tools • Heavy Equipment • PPE • Skid Steer Loader • Chains • Slings	• Pre-post maintenance • Visual prior to use	• Tailgate Safety Meeting • Site-specific orientation • Hazardous waste operations • Hazard communication • Lead Control Plan (if applicable)

JOB SAFETY ANALYSIS FOR HAND AUGER OPERATIONS

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Hand Auger Operations	Caught In/ Between Moving Parts	• Identify and understand parts of equipment which may cause crushing, pinching, rotating or similar injuries • Assure guards are in place to protect from these parts of equipment during operation • Provide and use proper work gloves when the possibility of crush, pinch, or other injury may be caused by moving/stationary edges or objects • Maintain all equipment in a safe condition • Keep all guards in place during use • De-energize and lock-out machinery before maintenance or service	Level D	
	Underground Utilities	• Identify all utilities around the site before work commences • Cease work immediately if unknown utility markers are uncovered • Use manual excavation within 3 feet of known utilities	Level D	
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, drilling overburden, debris and other materials • Mark, identify, or barricade other obstructions	Level D	
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition Keep guards in place during use	Level D /Leather gloves	

JOB SAFETY ANALYSIS FOR HAND AUGER OPERATIONS

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Hand/Power Auger Operations (Continued)	Sprains and Strains	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads • Perform muscle/stretch excercises • Avoid twisting, jerking motions while operating auger • Use firm footing and leverage; crouch/squat, bend at the knees • Wear grip gloves for firm dexterity while twisting hand auger	Level D	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)	Level D, Ear plugs	Sound Level Meter
	Burns	• Wear proper PPE for protection from hot motor parts, muffler	Level D,Leather gloves	
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants • Apply water spray if dust is generated during augering activities	Start with Level D	PID, LEL meter, and benzene detector tubes
	Insect Bites	• Review injury potential with workers • Avoid insect nests areas, likely habitats outside work areas • Emphasize The Buddy System where such injury potential exists • Use insect repellant, wear PPE to protect against sting/bite injuries.	If needed, Modified Level D, use Tyvek coveralls, duct tape bottom of coveralls to boots or latex boot covers	

JOB SAFETY ANALYSIS FOR HAND AUGER OPERATIONS

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Hand/Power Auger Operations (Continued)	Contact Dermatitis	• Wear PPE to avoid skin contact with contaminated soil, plants, or other skin irritants	Modified Level D, Tyvek coveralls, duct tape bottom of coveralls to boots or latex boot covers	
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with IT Health and Safety Procedures # HS400, HS401 • Provide fluids to prevent worker dehydration	Level D, Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

ACTIVITY HAZARD ANALYSIS FOR PRESSURE WASHING

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Pressure Washing	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, tools and debris • Mark, identify, or barricade other obstructions • Halt exterior work for high winds, severe weather		
	Struck by/Against Heavy Equipment, Protruding Objects	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals • Maintain three point contact when mounting/dismounting heavy equipment	Warning vests hard hat safety glasses, goggles and face shield, steel toe work boots	
	Inhalation and Contact with Hazardous Substances, & Splashes	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Wear hard hats, safety glasses with side shields, or goggles with splash shields and steel-toe safety boots	PVC rain suit or Tyvek coveralls, nitrile or latex gloves, neoprene or latex boots (See Section 5.0 HASP)	
	Burns	• Wear proper gloves, face shield/safety goggles, shin and toe guards, and splash suits to protect workers from skin burns and injury when operating laser (high pressure washers)	Goggles and face shield, shin and toe guards	

ACTIVITY HAZARD ANALYSIS FOR PRESSURE WASHING

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Pressure Washing (Continued)	Equipment Failure	• Ensure all fittings and hoses have the correct pressure rating and are in good operating condition • Protect all electrical equipment from water and splash • Insure equipment not in use is properly stored • Inspect all equipment according to manufacturer's specifications • Pressure test the unit with water at the maximum operating pressure • Check the dump system to ensure it is operating properly (Will it dump when released?)		
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with SEI Health and Safety Procedures # HS400, HS401 • Provide fluids to prevent worker dehydration • Follow work/rest schedule in Section 3.3.1/3.3.2 of the HASP	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

ACTIVITY HAZARD ANALYSIS FOR LEAD BASED PAINT ABATEMENT

Principal Steps	Potential Hazards	Recommended Controls
Inspection/Removal	Cuts	Use point scraper only and apply strokes away from body.
		Wear adequate hand protection.
	Inhalation hazards	Apply water mist to loose and free materials that may generate dust.
		Keep negative air machine running at all times.
		Wear power air purifying respirators (PAPRs).
		Follow decontamination procedures.
	Noise	If noise levels exceed 85 dBA wear hearing protection.
	Heavy lifting	Use safe lifting procedures. Loads over 60 lbs. require assistance or mechanical lifting device.
	Slip, trip and fall hazards	Maintain good housekeeping.
	Electrical shock	Follow preventative maintenance procedures recommended by the manufacturer.
		Use a lockout-tagout procedure for equipment found to be faulty or undergoing maintenance.
		Use ground fault circuit interruptor on all 120-volt energized equipment.
	Fire	Ensure that a dry chemical fire extinguisher will be readily available.
Cleaning	Degreasing agent - eye/skin contact	Use Level C protection.
Encapsulation	Latex paint - eye/skin contact	Use Level C protection.
Sampling	Splinters	Wear an extra layer of chemical protection gloves.

Equipment to be Used	Inspection Requirements	Training Requirements
Scrapers HEPA vacuum Negative air machine Degreasing agent Lead-free latex paint	Daily or each use	Tailgate safety meeting Site-specific training Hazardous waste operations MSDS file Lead abatement training (if applicable)

ACTIVITY HAZARD ANALYSIS FOR OVERHEAD/BELOWGRADE PIPING DECONTAMINATION

Principal Steps	Potential Safety Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Overhead/Below-grade Piping Decontamination	Fire/ Explosion	• Eliminate sources of ignition from the work area • Prohibit Smoking • Provide ABC (or equivalent) fire extinguishers in all work, flammable storage areas and with fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Prohibit storage, transfer of flammable liquids in plastic containers • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, caps in place when not in use		
	Flammable, Toxic, Oxygen deficient Atmospheres	• Test excavation atmosphere for flammable/toxic vapors, and oxygen deficiency • Obtain Confined Space Entry Permit signed by Supervisor/Safety Officer • De-energize, lock-out and tag all energized equipment • Provide written rescue plan • Review hazardous properties of site contaminants with entrants and safety observer • Review emergency procedures before work commences • Provide safety observer outside of excavation • Wear proper level of PPE for the type of atmospheric contaminants • Use body harness, safety belt with tripod winch for possible rescue		

ACTIVITY HAZARD ANALYSIS FOR OVERHEAD/BELOWGRADE PIPING DECONTAMINATION

Principal Steps	Potential Safety Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Overhead/Below-grade Piping Decontamination	Slips, Trips, Falls	• Clear walkways work areas of equipment, tools, vegetation, excavated material and debris • Mark, identify, or barricade other obstructions • Evaluate fall hazards above 4 ft.; use fall protection equipment (harness/lanyard), standard guardrails or other fall protection systems when working on elevated platforms above 6 ft. • Use "heavy duty industrial" (type IA) ladders • Inspect powered manlifts according to manufacturer's specifications • Only trained operators are permitted to use aerial lifts • Tie-off all straight/extension ladders or manually hold by co-worker at base • Anchorage points for fall arrest systems must support at least 5,400 pounds for each worker • Use 3 point contact when ascending/descending heavy equipment or ladders		
	Overhead/Underground Utilities	• Identify all utilities around the site before work commences • Cease work immediately if unknown utility markers are uncovered • Use manual excavation within 3 feet of known utilities • Utility clearance shall conform with 29 CFR 1926.955 (high voltage >700 kv) 15 feet phase to ground clearance; 31 feet phase to phase clearance		
	Burns	• Wear proper gloves, face shield/safety goggles, shin and toe guards, and splash suits to protect workers from skin burns and injury when operating pressure washers		

ACTIVITY HAZARD ANALYSIS FOR OVERHEAD/BELOWGRADE PIPING DECONTAMINATION

Principal Steps	Potential Safety Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Overhead/Below-grade Piping Decontamination	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin	Tyvek coveralls, latex or neoprene boots, nitrile gloves	LEL/O_2, PID
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear Plugs	Sound Level Meter
	Sharp Objects	• Wear cut-resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain hand and power tools in a safe condition • Keep guards in place during use	Reinforced leather Wizard gloves or equivalent	
	High/Low Ambient Temperature	• Monitor for heat/cold stress in accordance with OHM Health and Safety Procedures, SOPs 3-4 and 3-5 • Provide fluids to prevent worker dehydration		

Equipment to Be Used	Inspection Requirements	Training Requirements
• Man lift • Body harness, shock-absorbing lanyards • Air monitoring equipment • Ear plugs/muffs	• Inspect man lifts per manufacturer's specifications • Inspect Harnesses and lanyards before/after each use • Contact area utilities for underground utilities identification/location	• Review **SSHP** Review site-specific AHA with all task personnel • Permit only trained operators to operate man lifts • Review fall protection procedures with workers (non-routine task) • Review excavation/confined space procedures with workers (non-routine task)

ACTIVITY HAZARD ANALYSIS
OVERHEAD UTILITY

Activity	Hazards	Control Measures
Lockout/tagout	Electrocution	Only qualified electricians are allowed to perform lockout/tag out.
Disconnection/reconnection of power lines		Only qualified electricians are allowed to perform removal and disconnection.
	Falls	Fall protection is required for personnel working in man lifts.
	Overhead hazards	Nonessential personnel are not allowed in work area.
Equipment	**Inspection**	**Training**
• Man lifts • Lockout/tag out kits • Fall protection	• Pre/post use	• Safety meeting • Hazardous waste operations • Fall protection

ACTIVITY HAZARD ANALYSIS
PIPELINE TAPPING, REMOVAL, AND DISPOSAL

Activity	Hazards	Control Measures
Pipe draining & cleaning	Pressurized system	Remove caps slowly in open areas.
	Contact with pipeline material	Wear proper PPE.
	Spills	Make spill absorbing materials available.
	Fire	No open flames are allowed within 50 feet of work area.
		Place fire extinguisher within 10 feet of pipe draining and cleaning activities.
	Chemical exposure	Conduct air monitoring in accordance with Section 8 of this document.
Pipe cutting	Fire	Lower explosive limit readings must be ≤10% before cutting. A Hot Work permit is required.
		Use only cold cutting methods.
		Locate fire extinguishers within 5 feet of cutting operations.
Pipe cutting	Open excavations	Adhere to Shaw HS 307 at all times.
Disposal	Heavy lifting	Use proper lifting techniques.
		Cut pipe sections into manageable sections.
	Pinch hazards	Be aware of contact points.
	Heavy equipment	Stay clear of equipment swing radius.
	Overhead hazards	Never walk under suspended loads.

ACTIVITY HAZARD ANALYSIS
PIPELINE TAPPING, REMOVAL, AND DISPOSAL

Activity	Hazards	Control Measures
Pipe Tapping	Open trenches	Adhere to Shaw HS 307 at all times.
	Contact with potentially contaminated materials	Real time monitoring will take place. If necessary, proper personnel protective clothing and equipment will be utilized.
	Contact with moving equipment/vehicles	Work area will be barricaded/demarcated.
		Equipment will be laid out in an area free from traffic flow.
	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
		Initial real-time air monitoring will take place.
		Cold cutting only. No hot work anticipated.

ACTIVITY HAZARD ANALYSIS
PIPELINE TAPPING, REMOVAL, AND DISPOSAL

Activity	Hazards	Control Measures
Pipe Tapping (Continued)	Contact with toxic materials	Proper protective clothing and equipment will be used. Level of protection upgrade.
		MSDSs will be obtained and reviewed with all applicable employees.
	Pinch points	Keep hands, fingers, and feet clear of moving/suspended materials and equipment.
		Beware of contact points
		Stay alert at all times
	Cut hazards	Wear adequate hand protection
	Working at elevated heights/falls	Top, bottom, and intermediate fastenings as required will secure ladders.
	Bees, spiders, and snakes	Inspect work areas carefully and avoid placing hands and feet into concealed areas.
	Strains/sprains	Use the proper tool for the job being performed.
		Get assistance if needed.
		Avoid twisting/turning while putting on tools, etc.
	Slip, trip, and fall hazards	Determine best access route before transporting equipment.
		Good housekeeping; keep work area picked up and clean as feasible. Continually inspect the work area for trip, slip, and fall hazards.
		Look before you step; insure safe and secure footing.
	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment—size up lift. Recommend wearing a back support if possible.
	Falling objects	Stay alert and clear of materials suspended overhead. Use steel-toed boots and hardhat.
	Flying debris, dirt, dust, etc.	Use safety glasses/goggles. Ensure that eyewash is in good working order.
	CO monitoring	Use diesel-fired equipment indoors.
	Electrical	Use GFCIs on all 110-volt circuits.
	Lighting	Provide adequate lighting to ensure a safe working environment.

ACTIVITY HAZARD ANALYSIS
PIPELINE TAPPING, REMOVAL, AND DISPOSAL

Activity	Hazards	Control Measures
Pipe Tapping (Continued)	Unattended worker	"Buddy System"—visual contact will be maintained with the technician during cutting activities.
	Hand tools	Use tools intended for the task and wear proper PPE.
		Broken or damaged tool use is prohibited. Repair or replace unsuitable equipment prior to use.
	Pinch hazards	Be aware of contact points and interferences between equipment and PPE.
		Wear hand protection.
Equipment	**Inspection**	**Training**
• Heavy equipment • Hand tools • PPE • Air monitoring equipment • Chain and sling	• Pre/post • Visual before use	• Tailgate safety • Site specific • Hazardous materials operations • Excavation safety • Asbestos Plan (if applicable)

ACTIVITY HAZARD ANALYSIS FOR STEAMLINE REMOVAL (ASBESTOS REMOVAL)

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Inspection and sampling	Knife cuts/improper use of hand tools	Cutting strokes will always be away from the body. Powered hand tools must be battery operated or properly grounded.
		Leather gloves will be worn when cutting.
		Place knife in sheath or holder when not in use.
		Unused knives will never be left with cutting edges exposed.
		Never use a knife that is defective or has a broken blade or handle.
		Never use a knife as a pry bar or screwdriver.
		Do not use a dull blade; replace or have sharpened prior to use.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Stay alert at all times!
	Fire	A dry chemical fire extinguisher with a minimu m UL rating of 5ABC will be readily available.
		No smoking or open flames within buildings.
		Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable conditions.
		All hoses, couplings, fixtures, etc. shall be properly bonded and grounded.
		Shaw HS314, "Hot Work in Hazardous Locations," Policy and Procedure shall be adhered to at all times.
	Inadequate illumination	Ensure that adequate lighting requirements are present.
	Poisonous plants/spiders	Individuals must be aware of the potential for these hazards to be present. Inspect work area closely for their presence.
	Faulty or damaged equipment	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and verified to be in safe operating condition.

ACTIVITY HAZARD ANALYSIS FOR
STEAMLINE REMOVAL (ASBESTOS REMOVAL)

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Inspection and sampling *(continued)*		Equipment shall be inspected before being placed into services and at the beginning of each shift.
	Electrical hand tools/electrocution	Preventive maintenance procedures recommended by the manufacturer shall be followed.
	Electrical hand tools/electrocution (*continued*)	A lockout-tag out procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Ground fault circuit interrupters, inspect extension cords, hand tool inspection, lockout-tag out procedure.
	Slip, trip, and fall hazards	Maintain good housekeeping.
	Confined spaces	Follow policy and procedures for confined spaces.
		All work areas will be evaluated by an H&S professional prior to initiation of work activities. Attention will be paid to crawl spaces, attics, conduits, and suspended pipes.
	Scaffolding	Shaw Policy and Procedure HS308, "Scaffolding" will be adhered to at all times.
		Scaffolds and their components will be capable of supporting without failure at least 4 times the maximum anticipated load.
		Scaffolds will be plumb and level.
		Scaffolds will bear and base plates upon sills of other adequate foundation.
		Working levels of work platforms will be fully planked or decked.
		All planking of platforms will be either overlapped a minimum of 12 inches or secured from movement.
		Scaffold planks will extend over their end supports not less than 6 inches nor more than 18 inches.
		Planking on scaffolds will extend from the toe board to not more than 14 inches from the face of the structure unless standard guard rails are installed or personal fall protection systems are used.

ACTIVITY HAZARD ANALYSIS FOR
STEAMLINE REMOVAL (ASBESTOS REMOVAL)

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Inspection and sampling *(continued)*		Planking will be supported or braced to prevent excessive spring or deflection; secured and supported to prevent loosening, tipping, or displacement.
		Work platforms will be securely fastened to the scaffold.
		An access ladder or equivalent safety access will be provided.
		Climbing of braces is prohibited.
		When the scaffold height exceeds 4 times the minimum scaffold base dimension (including the width added by outriggers) the scaffold will be secured to the structure.
		Sections of metal scaffold will be securely connected and all braces will be securely fastened.
	Scaffolding *(continued)*	Scaffolds will be properly braced by cross, horizontal, or diagonal braces or a combination of these braces, so that vertical members are securely together laterally and the cross braces will be of such a length so that they will automatically square and align vertical members so that the erected scaffold is always plumb, square, and rigid.
		Frames will be placed one on top of the other with coupling or stacking pins to provide vertical alignment of the legs.
		If uplift may occur, panels will be locked together vertically by pins or equivalent means.
	Wood framing	Exposed nails will be bent over or removed.
		Lumber piles that will be manually handled will not exceed 16 feet in height.
		Personnel erecting wood framing will use leather palm gloves.
		Hand and power tools will be inspected, tested, and determined to be in safe operating condition prior to use.
		Power tools designed to accommodate guards will be equipped with such guards when in place.

ACTIVITY HAZARD ANALYSIS FOR STEAMLINE REMOVAL (ASBESTOS REMOVAL)

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Inspection and sampling *(continued)*	Heat/cold stress	Heat/cold stress conditions are not anticipated.
	Ladder use	Portable ladders will be of sufficient length (extend 3 feet above landing) and be placed so that workers will not stretch or assume a hazardous position.
		Length of stepladders will not exceed 20 feet.
		Wood ladders will not be covered with any opaque covering.
		Do not place ladders in passageways, doorways, drives, or locations, which may be displaced.
		Top, bottom, and intermediate fastenings as required should secure ladders.
		Portable ladders will have slip resistant feet.
		Ladders will not be moved, shifted, or extended while occupied.
		The top or top step of a stepladder will not be used as a step.
		Ladders will be inspected for defects on a daily basis.
		Broken or damaged ladders will be immediately tagged and withdrawn from service.
Pre-cleaning of Abatement Areas	Flying debris	Wear respirators at all times.
	Pinch points	Keep feet and hands clear of pinch point areas and suspended materials.
	Hazard communication	Use proper labeling/MSDSs.
	Noise	Noise levels above 85 dBA mandate hearing protection.
	Heavy lifting	Any lifting over 60 lbs. requires assistance or the use of a mechanical lifting device.
	Moving equipment	Signal person will assist in positioning equipment.
	Contact with contaminants	Personnel will wear adequate protective clothing and equipment to protect themselves against contact with contaminants.

ACTIVITY HAZARD ANALYSIS FOR STEAMLINE REMOVAL (ASBESTOS REMOVAL)

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Pre-cleaning of Abatement Areas *(continued)*		MSDSs of all materials and contaminants will be obtained and reviewed with applicable personnel.
	Working at elevated heights	Anyone working in excess of 6 ft. from surface level is required to be protected.
		Follow lanyards, lifelines, harness, and ladder/scaffolding safety.
	Faulty HEPA vacuum	Before the HEPA vacuum is placed into service, it shall be inspected and tested by a competent person and verified to be in proper operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventative maintenance procedures recommended by the manufacturer shall be followed.
	Slips, trips, and fall hazards	Extension cords and materials will be placed in a "workman" like manner.
		Special care should be used when walking in areas where wetting agents have been used.
	Exposure to airborne contaminants	Integrated air monitoring will take place.
		Respiratory protection will be worn.
	Electrocution	All electrical circuits in the work area will be de-energized and temporary power will be utilized in conjunction with ground fault circuit interrupters.
	Spillage of contaminated wastes	Bags of contaminated wastes will be handled with care. Do not place where they can be punctured or damaged.
		Roll-off containers will be of adequate size to hold anticipated quantities.
	Spillage of contaminated wastes *(continued)*	HEPA vacuums will be available to pick up and contain minor spills.
		Full bags will be sealed using duct tape.

ACTIVITY HAZARD ANALYSIS FOR STEAMLINE REMOVAL (ASBESTOS REMOVAL)

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Asbestos abatement	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift.
	Slip, trip, and fall hazards	Maintain good housekeeping; keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip, and fall hazards.
	Cut hazards	Wear adequate hand protection.
	Lighting	Adequate lighting will be provided to ensure a safe working environment.
	Strains/sprains	When pulling or lifting, do not turn or twist your back.
		Use the proper tool for the task being performed.
	Contact with potentially contaminated materials	Appropriate PPE will be required.
		Keep airborne particulates to a minimum.
		Air monitoring will take place.
		Liberal use of wetting agents.
	Contact with potentially contaminated materials	Practice good housekeeping, avoid spreading potentially contaminated materials.
	Slip, trip, and fall hazards	Maintain good housekeeping; keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip, and fall hazards. Look where you step, ensure safe footing when climbing, etc.
	Strains/sprains	Use proper lifting techniques. Lifts great than 60 lbs. require assistance or mechanical equipment. Size-up the lift. When pulling on materials, pull in a straight line. Do not twist and pull simultaneously.
Final cleanup and application of encapsulant	Contact with encapsulate chemicals	Proper protective clothing and equipment will be used according to MSDS.
		Air monitoring will take place. Proper personal protective clothing and equipment will be utilized.

ACTIVITY HAZARD ANALYSIS FOR STEAMLINE REMOVAL (ASBESTOS REMOVAL)

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Final cleanup and application of encapsulant (*continued*)		Good housekeeping will be stressed to safeguard against cross-contamination of surrounding areas and eliminate safety hazards.
		All site personnel will practice good personal hygiene.
	Contact with potentially contaminated materials (*continued*)	The work area will be demarcated. All unnecessary personnel will be kept out of the work area.
	Slip, trip, and fall hazards	Maintain good housekeeping; keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip, and fall hazards.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
	Hazard communication	Label all containers as to contents and dispose of properly.
		Obtain MSDSs for encapsulants, etc. that are being used.
Teardown of containment/glove bag	Fire	Fire extinguishers shall be suitable placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition. See Table 3-6.
	Strains and sprains	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment. Size up the lift.
	Noise	Noise levels above 85 dBA mandates hearing protection.

Equipment to be Used	Inspection Requirements	Training Requirements
• Hand tools • PVC pipe • Polyethylene sheeting • Air monitoring equipment • HEPA filtered vacuum cleaner • Hudson sprayers • Signs	• Pre-/post-maintenance • Visual prior to use • Manufacturers' recommendations • Hot Work Permit	• Tailgate Safety Meeting • Site-specific orientation • Asbestos training • Confined spaces (if applicable)

ACTIVITY HAZARD ANALYSIS FOR STEAMLINE REMOVAL (ASBESTOS REMOVAL)

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
• Rags • Extension cords • Ground fault circuit interrupters • Spray glues • Glove bags		

ACTIVITY HAZARD ANALYSIS FOR TANK REMOVAL AND CLEANING

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Air Monitoring Devices
Excavation of Tank	Underground/ Overhead Utilities	• Identify all utilities around the site before work commences • Cease work immediately if unknown utility markers are uncovered • Use manual excavation within 3 feet of known utilities • Utility clearance shall conform with 29 CFR 1926.955 (high voltage >700 kv) 15 feet phase to ground clearance; 31 feet phase to phase clearance		

ACTIVITY HAZARD ANALYSIS FOR TANK REMOVAL AND CLEANING

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Air Monitoring Devices
Excavation of Tank (continued)	Excavation Wall Collapse	• Construct diversion ditches or dikes to prevent surface water from entering excavation • Provide good drainage of area adjacent to excavation • Collect ground water/rain water from excavation and dispose of properly • Store excavated material at least 2 feet from the edge of the excavation; prevent excessive loading of the excavation face • Provide sufficient stairs, ladders, or ramps when workers enter excavations over 4 feet in depth • Place ladders no more than 25 feet apart laterally • Treat excavations over 4 feet deep as confined spaces • Complete confined space permit entry procedure • Monitor atmosphere for flammable/toxic vapors, and oxygen deficiency • Slope, bench, shore, or sheet excavations over 5 feet deep if worker entry is required • Assign a competent person to inspect, decide soil classification, proper sloping, the correct shoring, or sheeting • Inspect excavations (when personnel entry is required) daily, whenever conditions change • Provide at least two means of exit for personnel working in excavations.	Hard hat, Safety glasses, Steel toe work boots	

ACTIVITY HAZARD ANALYSIS FOR TANK REMOVAL AND CLEANING

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Air Monitoring Devices
Excavation of Tank (Continued)	Struck By/ Against Heavy Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals	Warning vest, Hard hat, Safety glasses, Steel toe work boots	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris • Mark, identify, or barricade other obstructions • Evaluate fall hazards above 4 ft.; use fall protection equipment (harness/lanyard), standard guardrails or other fall protection systems when working on elevated platforms above 6 ft. • Use ?heavy duty industrial? (type IA) ladders • Install and inspect scaffolds according to manufacturers requirements • Only trained operators are permitted to use aerial lifts • Tie-off all straignt/extension ladders or manually hold by co-worker at base • Anchorage points for fall arrest systems must support at least 5,400 pounds for each worker		

ACTIVITY HAZARD ANALYSIS FOR TANK REMOVAL AND CLEANING

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Air Monitoring Devices
Excavation of Tank (Continued)	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Wizard or similar cut resistant gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile gloves, latex or neoprene boots (see Section 5.0 HASP)	LEL/O_2, PID
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with SEI Health and Safety Procedures # HS400, HS401 • Provide fluids to prevent worker dehydration • Follow work/rest schedule in Section 3.3.1/3.3.2 of the HASP	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

ACTIVITY HAZARD ANALYSIS FOR TANK REMOVAL AND CLEANING

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Air Monitoring Devices
Tank Cleaning	Fire/ Explosion	• Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers in all work, flammable storage areas and with fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Prohibit storage, transfer of flammable liquids in plastic containers • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum	Portable fire extinguisher	LEL/O_2
	Flammable, Toxic, Oxygen deficient Atmospheres	• Test vessel atmosphere for flammable/toxic vapors, and oxygen deficiency • Obtain Confined Space Entry Permit signed by Supervisor/Safety Officer • De-energize, lock-out and tag all energized equipment • Provide written rescue plan • Review hazardous properties of site contaminants with entrants and safety observer • Review emergency procedures before work commences • Provide safety observer outside vessel • Wear proper level of PPE for the type of atmospheric contaminants • Use body harness, safety belt with tripod winch for possible rescue	Portable fire extinguisher	LEL/O_2

ACTIVITY HAZARD ANALYSIS FOR TANK REMOVAL AND CLEANING

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Air Monitoring Devices
Tank Cleaning (Continued)	Burns	• Wear proper work gloves, face shield/safety goggles, and leather apron to protect workers from skin burns when welding, cutting, and burning	Face shield, Safety goggles	
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile gloves, latex or neoprene boots (see Section 5.0 HASP)	LEL/O_2, PID
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
Backfilling	Struck By/ Against Heavy Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review posted hand signals	Warning vest, Hard hat, Safety Glasses, Steel toe work boots	
	Slips, Trips, Falls	• Clear, walkways of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions		

ACTIVITY HAZARD ANALYSIS FOR TANK REMOVAL AND CLEANING

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Air Monitoring Devices
Backfilling (Continued)	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with SEI Health and Safety Procedures # HS400, HS401 • Provide fluids to prevent worker dehydration • Follow work/rest schedule in Section 3.3.1/3.3.2 of the HASP	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

ACTIVITY HAZARD ANALYSIS FOR UNDERGROUND UTILITY LINES

Principal Activity	Potential Safety/Health Hazards	Recommended Control
Repair of water lines, storm water lines, and oil recovery system	Excavations	All work in excavations must be in compliance with Section 3 of this document.
	Fire	A Hot Work permit is required for all Hot Work.
	Heavy equipment	All hoisting operations must be conducted using proper equipment.
Equipment	**Inspection**	**Training**
Heavy equipment	Pre-post	Tailgate safety meeting

ACTIVITY HAZARD ANALYSIS FOR UTILITY CLEARANCE/SURVEYING

Principal Activity	Potential Safety/Health Hazards	Recommended Controls
Surveying	Slips, trips, and falls	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work areas for slip, trip, and fall hazards
		When working on uneven surfaces, take care when stepping. Watch where you walk.
	Moving vehicles	The wearing of high visibility vests is required in areas where vehicle traffic may be encountered.
		Flaggers and traffic control devices such as cones and barricades may be needed when working in traffic.
Equipment to be Used	**Inspection Requirements**	**Training Requirements**
• Survey Equipment • PPE	• None	• Tailgate safety meeting • Site specific orientation • Hazard communications

ACTIVITY HAZARD ANALYSIS FOR PRODUCT REMOVAL AND VACUUM EXTRACTION TESTING

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Product Removal, Vacuum Testing	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile gloves, latex or neoprene boots (see Section 5.0 HASP)	LEL/O_2, PID
	Struck by/ Against Heavy Equipment, Protruding Objects	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Wear hard hats, safety glasses with side shields, or safety goggles with splash shields, and steel-toe safety boots at all times • Understand and review posted hand signals	Warning vest, Hard hat, Safety glasses, Steel toe work boots	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Slips, Trips, Falls	• Clear, walkways of equipment, tools, and other materials • Mark, identify, or barricade other obstructions		
	Fire/ Explosion	• Eliminate sources of ignition from the work area • Prohibit smoking in work areas • Provide ABC (or equivalent) fire extinguishers in all work areas • Post "NO SMOKING" signs • Store combustibles away from compressors, other fuel powered equipment	Portable fire extinguisher	

ACTIVITY HAZARD ANALYSIS FOR
PRODUCT REMOVAL AND VACUUM EXTRACTION TESTING

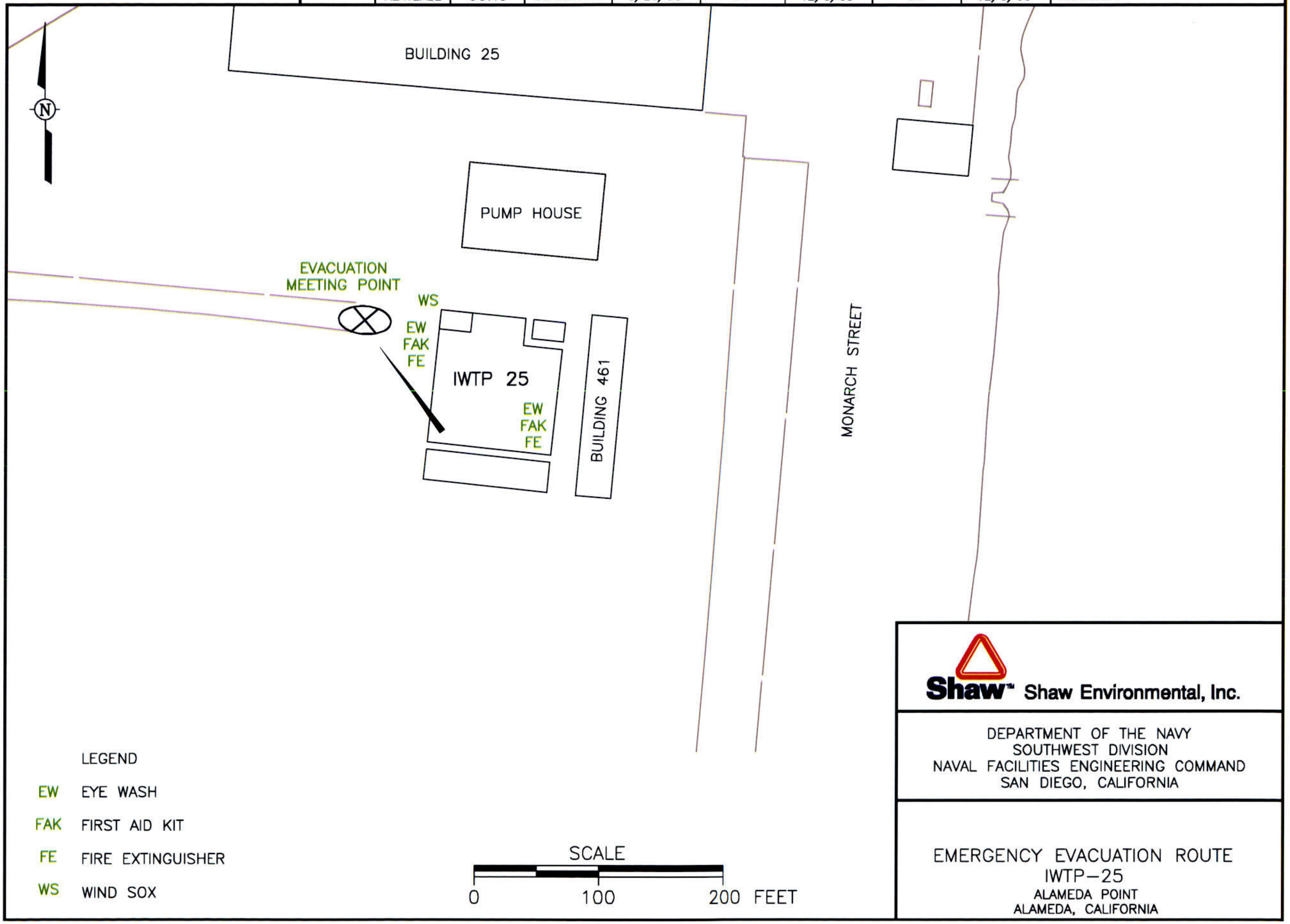
Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Product Removal, Vacuum Testing (Continued)	Burns	• Wear proper clothing (long sleeve shirts, gloves) when operating, servicing hot fuel powered equipment	Long sleeve shirt, rubber apron, goggles and face shield	
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for tructural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with SEI Health and Safety Procedure # HS315	Lockout-Tagout Devices	Voltage Meter or ?Tic? Tracer

ACTIVITY HAZARD ANALYSIS FOR PRODUCT REMOVAL AND VACUUM EXTRACTION TESTING

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Product Removal, Vacuum Testing (Continued))	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with SEI Health and Safety Procedures # HS400, HS401 • Provide fluids to prevent worker dehydration • Follow work/rest schedule in Section 3.3.1/3.3.2 of the HASP	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

Attachment E
Exclusion Zone and Muster Point Location Maps

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
---	ALA1BASE	CONC	SCHAEFFER	8/26/03	SK	12/3/03	JW	12/3/03	807181-A81

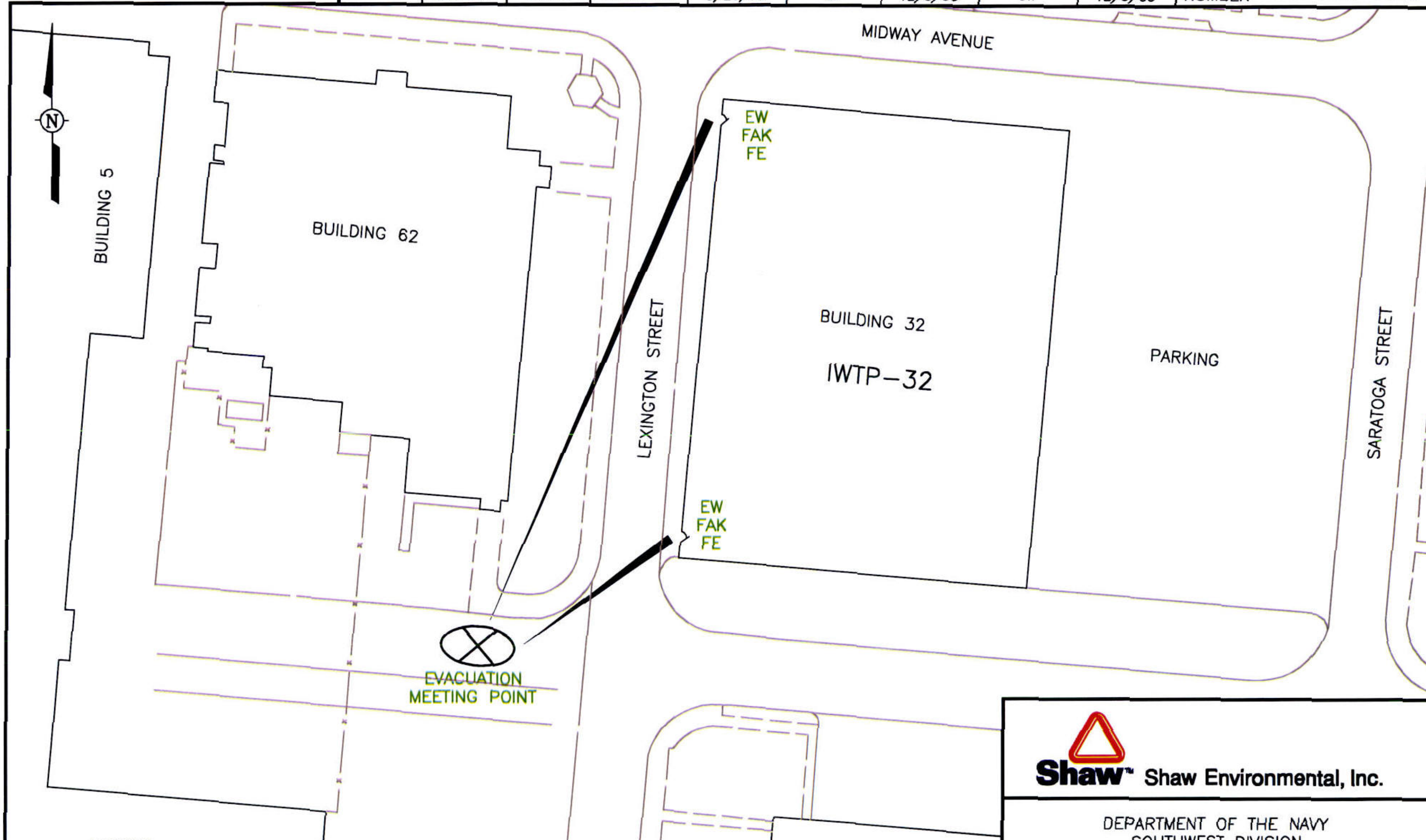


Shaw™ Shaw Environmental, Inc.

DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
SAN DIEGO, CALIFORNIA

EMERGENCY EVACUATION ROUTE
IWTP-25
ALAMEDA POINT
ALAMEDA, CALIFORNIA

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
---	ALA1BASE	CONC	SCHAEFFER	8/26/03	SK	12/3/03	JW	12/3/03	807181-A80



LEGEND

EW EYE WASH

FAK FIRST AID KIT

FE FIRE EXTINGUISHER

WS WIND SOX

SCALE

0 80 160 FEET

Shaw™ Shaw Environmental, Inc.

DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
SAN DIEGO, CALIFORNIA

EMERGENCY EVACUATION ROUTE
IWTP-32
ALAMEDA POINT
ALAMEDA, CALIFORNIA

Attachment F
Lead Compliance Plan

Attachment F
Preliminary Lead Compliance Plan
CTO 0013

This preliminary compliance plan has been prepared in accordance with the Cal/OSHA lead standard found in 8 CCR 1532. It will be revised upon final selection of a demolition subcontractor. The specific lead abatement techniques to be used will be included at that time.

1. Activity. Spot abatement of LBP will be required to facilitate demolition operations. The spot abatement will involve removing LBP from areas that would be cut to minimize risks of uncontrolled exposure to lead particulates or fumes during disassembly.

2. Lead exposure controls. Worker exposure during spot removal of LBP will be controlled with a combination of wetting, dilution ventilation and respiratory protective equipment.

3. Technology. Paint can be removed by using hand powered tools applied directly to the painted surface to remove the coating by a reciprocating or rotating action. Examples of tools that can be used are rotary peening machines, needle guns, water power washers, and hand scrapers. Alternatively, abatement activity could involve the chemical application of acidic or caustic agents to the paint surface to dissolve the paint.

4. Lead source. The source of the lead emissions is known to be lead based paint on the structures to be demolished.

5. Schedule. To be determined.

6. Work Practices. To be determined.

7. All workers will be informed of potential lead exposure hazards prior to commencement of work.

Appendix C
Project Quality Control Plan

FINAL

PROJECT QUALITY CONTROL PLAN
RCRA Corrective Actions at IWTPs 25 and 32
Alameda Point, Alameda California

Environmental Remedial Action
Contract Number N62474-98-D-2076
Contract Task Order 0013

Document Control Number 7031
Revision 0

December 8, 2003

Approved by: ____________________ Date: December 8, 2003
Dan Shafer
Shaw Project Manager

Approved by: ____________________ Date: December 8, 2003
Stephen Massey
Shaw Program Quality Control Manager

Table of Contents

List of Attachments

Acronyms and Abbreviations

IWTP	Industrial Waste Treatment Plant
PQCP	Project Quality Control Plan
QC	quality control
QCPP	Quality Control Program Plan
RCRA	Resource Conservation and Recovery Act
SOP	Standard Operating Procedures
SQP	Standard Quality Procedures

1.0 Introduction

This Project Quality Control Plan (PQCP) has been prepared to describe the quality control (QC) actions that Shaw Environmental, Inc. will implement during the Resource Conservation and Recovery Act (RCRA) Removal Actions and Industrial Waste Treatment Plants (IWTPs) 25 and 32 at Alameda Point, Alameda California.

This PQCP will be used in conjunction with the Quality Control Program Plan (QCPP) that Shaw has prepared for work under Remedial Action Contract No. N62474-98-D-2076 and with Shaw Standard Quality Procedures (SQPs)/Standard Operating Procedures (SOPs), as applicable. Section 2.0 of this PQCP describes the sections of the QCPP that are applicable to this project and any site-specific modifications to the QCPP that are required. Section 3.0 of this PQCP lists the SQPs and SOPs that are applicable. Attachments 1 through 6 present the following supporting documents for the site-specific QC activities that Shaw will perform throughout the execution of this project:

- Attachment 1 - Project QC Manager Letter of Designation
- Attachment 2 - Alternate Project QC Manager Letter of Designation
- Attachment 3 - QC Organization Chart
- Attachment 4 - Definable Features of Work Matrix
- Attachment 5 - Testing Plan and Log
- Attachment 6 - Submittal Register

2.0 Quality Control Program Plan

The following portions of the QCPP are applicable to the work conducted under this project with modifications as noted:

- Management Policy Statement: applicable in its entirety
- Section 1.0 - Introduction: applicable in its entirety
- Section 2.0 - Organization and Responsibilities: applicable with the following modification:
  - The QC organization will be as shown in the "QC Organization Chart," presented in Attachment 3
- Section 3.0 - Quality Control Management: applicable in its entirety
- Section 5.0 - Instructions, Procedures, and Drawings: applicable in its entirety
- Section 6.0 - Document Control: applicable in its entirety
- Section 7.0 - Procurement: applicable in its entirety
- Section 8.0 - Chemical Data Quality: applicable in its entirety
- Section 9.0 - Field Sampling: applicable as described in the Sampling and Analysis Plan
- Section 10.0 - Laboratory Analysis: applicable as described in the Sampling and Analysis Plan
- Section 11.0 - Report Preparation: applicable in its entirety
- Section 12.0 - Review of Work Activities: applicable in its entirety
- Section 13.0 - Inspections: applicable in its entirety
- Section 14.0 - Calibration and Maintenance of Measuring and Test Equipment: applicable in its entirety
- Section 15.0 - Test Control: applicable in its entirety
- Section 16.0 - Nonconformance Control and Corrective Actions: applicable in its entirety
- Section 17.0 - Change Control: not applicable. Refer to the Working Draft Project Management Guidelines, date May 16, 2001
- Section 18.0 - Audits and Surveillance: applicable with the following modification:

- Subsections 18.1 through 18.8 do not apply

- Section 19.0 - Records Management: applicable in its entirety

3.0 Procedures

3.1 Standard Quality Procedures

The following SQPs have been determined to be applicable to this project:

- SQP 1.1 - Contractor Quality Control Program
- SQP 3.2 - Indoctrination and Training
- SQP 4.1 - Document Control
- SQP 4.2 - Records Management
- SQP 5.1 - Preparation, Revision, and Approval of Plans and Procedures
- SQP 6.1 - Preparation, Review, and Approval of Procurement Documents
- SQP 7.1 - Quality Inspections and Inspection Records
- SQP 7.2 - Receipt Inspection
- SQP 8.2 - Calibration and Maintenance of Measuring and Test Equipment
- SQP 10.1 - Nonconformance Control
- SQP 10.2 - Corrective Action
- SQP 13.1 - Coordination of Subcontracted Analytical Laboratories

3.2 Standard Operating Procedures

The following SOPs have been determined to be applicable to this project:

- SOP 1.1 - Chain of Custody
- SOP 2.1 - Sample Handling, Packaging, and Shipping
- SOP 3.1 - Surface and Shallow subsurface Soil Sampling
- SOP 3.5 - Soil Sampling with Encore Sampler for Volatile Organic Compounds
- SOP 5.1 - Water Level Measurements in Monitoring Wells
- SOP 6.1 - Sampling Equipment and Well Material Decontamination
- SOP 6.2 - Drilling and Heavy Equipment Decontamination
- SOP 8.1 - Monitoring Well Installation
- SOP 8.2 - Monitoring Well Development
- SOP 9.1 - Groundwater Sampling
- SOP 17.1 - Sample Labeling
- SOP 17.2 - Sample Numbering
- SOP 18.1 - Field QC Sampling
- SOP 19.1 - On-Site Sample Storage
- SOP 23.1 - Land Surveying

Attachment 1
Project QC Manager Letter of Designation

RCRA Removal Actions at IWTPs 25 and 32
Alameda Point, Alameda California

Contract Task Order 0013

Project QC Manager
Letter of Designation

December 8, 2003

Mr. Eric Watabayashi:

This letter will serve to assign you as Shaw Environmental, Inc.'s Project QC Manager for the above-captioned contract task order. In the event that you are unable to perform the Project QC Manager's duties, Mr. Lee Laws or Mr. Brooks Gaither will serve as your Alternate Project QC Manager. In the role of Project QC Manager, you will have the responsibilities and authorities designated in Section 2.1.3 of the Quality Control Program Plan (QCPP). Additionally, you are granted stop work authority and will exercise this authority consistent with the QCPP, Section 16.4. You are granted the authority to approve Shaw-approved submittals which have been certified by qualified submittal reviewers, as identified in the QC Organization Chart for this contract task order, to ensure the quality of the work, and to direct the removal and/or replacement of nonconforming materials or work. In this capacity, you will report directly to me and will administer the established requirements of the contract task order Project QC Plan.

If you have any questions or require additional information, please contact me at (619) 446-4522.

Sincerely,
Shaw Environmental, Inc.

Stephen Massey
Program QC Manager

Attachment 2
Alternate Project QC Manager Letter of Designation

RCRA Removal Actions at IWTPs 25 and 32
Alameda Point, Alameda California

Contract Task Order 0013

Alternate Project QC Manager
Letter of Designation

December 8, 2003

Mr. Lee Laws and Mr. Brooks Gaither:

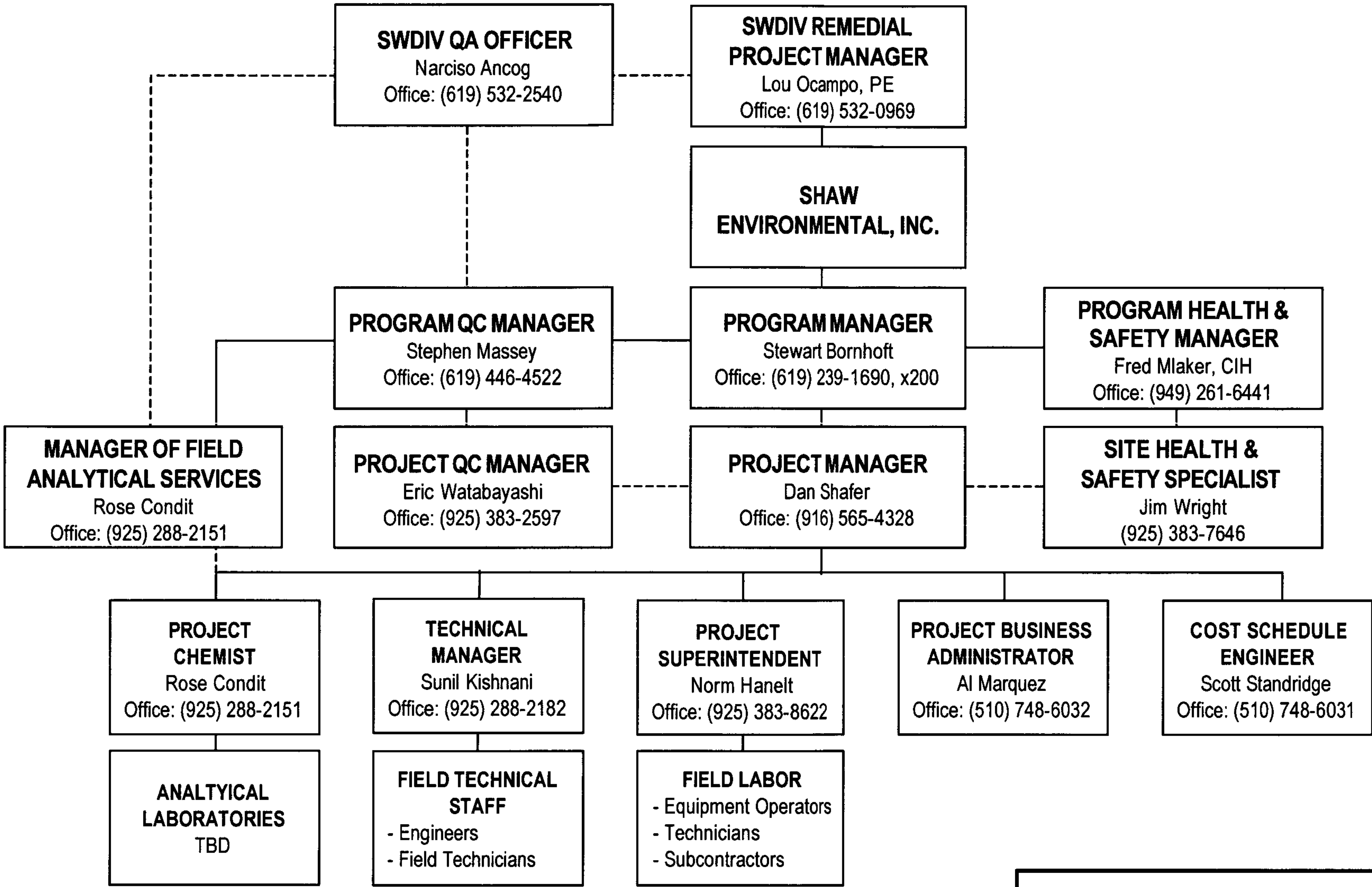
This letter will serve to assign you as Shaw's Alternate Project Quality Control (QC) Manager for the above captioned contract task order. In the case where the designated Project QC Manager, Mr. Eric Watabayashi, is unable to perform the Project QC Manager's duties, you will serve in that capacity. In this role, you will have the responsibilities and authorities designated in Section 2.1.3 of the Quality Control Program Plan (QCPP). Additionally, you will have stop work authority and will exercise this authority consistent with the QCPP, Section 16.4. You are granted the authority to approve Shaw-approved submittals which have been certified by qualified submittal reviewers, as identified on the QC Organization Chart for this contract task order, to ensure the quality of the work, and to direct the removal and/or replacement of nonconforming materials or work. You will be authorized to act as an alternate for 14 consecutive working days or 30 non-consecutive working days at a maximum. You will report directly to me and will administer the established requirements of the contract task order Project QC Plan.

If you have any questions or require additional information, please contact me at (619) 446-4522.

Sincerely,
Shaw Environmental, Inc.

Stephen Massey
Program QC Manager

Attachment 3
Quality Control Organization Chart



Quality Control Organization Chart
IWTPs 25 & 32
CTO 0013

Attachment 4
Definable Features of Work Matrix

Definable Features of Work Matrix
RCRA Removal Actions at IWTPs 25 and 32
Alameda Point, Alameda, California

Document	Paragraph No.	Feature of Work	Task Lead	Preparatory Meeting	Preparatory Inspection	Initial Inspection	Follow-Up Inspection	Completion Inspection
Work Plan	4.2	Soil & Groundwater Sampling	Rose Condit	Rose Condit	Rose Condit	Rose Condit	Eric Watabayashi	na
Work Plan	4.3	Concrete Chip Sampling	Rose Condit	Rose Condit	Rose Condit	Rose Condit	Eric Watabayashi	na
Work Plan	6.0	Tank & Waste Conveyance Piping Removal	Sunil Kishnani	Sunil Kishnani	Sunil Kishnani	Sunil Kishnani	Eric Watabayashi	Eric Watabayashi
Work Plan	6.1.2	Spot LBP Abatement at IWTP 25	Sunil Kishnani	Sunil Kishnani	TBD	TBD	TBD	TBD
Work Plan	6.1.5	IWTP 32 Sump Closure	Sunil Kishnani	Sunil Kishnani	Sunil Kishnani	Sunil Kishnani	Eric Watabayashi	Eric Watabayashi

Attachment 5
Testing Plan and Log

TESTING PLAN AND LOG

Contract Number N62474-98-D-2076 Contract Task Order 0013			RCRA Removal Actions at IWTPs 25 and 32 Alameda Point, Alameda, California							CONTRACTOR Shaw Environmental, Inc.	
Specification Section and Paragraph Number	Test Procedure	Test Name	Accredited/ Approved Lab		Sampled By	Location of Test		Frequency Of Test	Date Complete	Date Forwarded to Contr. Off	Remarks
			YES	NO		ON SITE	OFF SITE				
**											

*** No testing activities have been identified for field activities under this CTO*

Attachment 6
Submittal Register

SUBMITTAL REGISTER

CONTRACT NUMBER N62474-98-D-2076 CTO 0013

TITLE AND LOCATION: RCRA Removal Actions as IWTPs 25 and 32, Alameda Point, Alameda, CA

CONTRACTOR Shaw Environmental, Inc.

SPECIFICATION SECTION Base Contract

TRANS-MITTAL NO.	ITEM NO.	SPECIFICATION PARAGRAPH NO.	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL: DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	CLASSIFICATION: INFORMATION ONLY	GOVERNMENT APPROVED	REVIEWER	CONTRACTOR SCHEDULE DATES: SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CONTRACTOR ACTION: CODE	DATE	SUBMIT TO GOVERNMENT	GOVERNMENT ACTION: CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y
	001	N/A	Sampling and Analysis Plan, SD-08					X						X										
	002	5.3.2	Site Health and Safety Plan, SD-08					X						X										
	003	6.5.2	Project QC Plan w/Submittal Register, SD-08					X						X										
	004	8.0	Environmental Protection Plan, SD-08					X						X										
	005	N/A	Work Plan, SD-08					X						X										
	006	4.2	Hazardous Waste Management Plan, SD-08					X						X										
	007	3.4	As-Built Records, SD-04									X	X											

(1) Days are based on a five-day workweek.

SUBMITTAL REGISTER

CONTRACT NUMBER N62474-98-D-2076 CTO 0013

TITLE AND LOCATION: RCRA Removal Actions as IWTPs 25 and 32, Alameda Point, Alameda, CA

CONTRACTOR Shaw Environmental, Inc.

SPECIFICATION SECTION SOW

TRANS-MITTAL NO.	ITEM NO.	SPECIFICATION PARAGRAPH NO.	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL: DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	CLASSIFICATION: INFORMATION ONLY	GOVERNMENT APPROVED	REVIEWER	CONTRACTOR SCHEDULE DATES: SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CONTRACTOR ACTION: CODE	DATE	SUBMIT TO GOVERNMENT	GOVERNMENT ACTION: CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y
	001	E.1	Internal Draft Closure Report, SD-18									X		X										
	002	E.2	Draft Closure Report, SD-18									X		X										
	003	E.3	Final Closure Report, SD-18									X		X										

(1) Days are based on a five-day workweek.